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FROM

State board of agriculture

28 June, 1897.

W. J. Beal

INSTITUTE BULLETIN NO. [illegible] [illegible]97.

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PUBLISHED BY

STATE BOARD OF

AGRICULTURAL [illegible]
1897

Michigan - State Board of Agriculture.

INSTITUTE BULLETIN NO. 3. **MAY, 1897.**

MICHIGAN

STATE

FARMERS' INSTITUTES

WINTER OF 1896-7

PUBLISHED BY AUTHORITY OF THE

STATE BOARD OF AGRICULTURE

AGRICULTURAL COLLEGE, MICH.
1897

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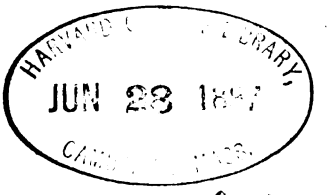

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KENYON L. BUTTERFIELD, - - - AGRICULTURAL COLLEGE, MICH.

LETTER OF TRANSMITTAL.

HON. FRANKLIN WELLS, *President State Board of Agriculture:*

DEAR SIR—I herewith transmit a report of the Farmers' Institute work carried on under the direction of your honorable Board during the winter of 1896-7.

We have included in the report a discussion of some of the chief features of our work and some necessary statistical matter. A large portion of the report, as last year, is occupied with the report of the "Roundup" meeting. By dispensing with the services of a stenographer at this meeting and limiting the reports of set addresses to abstracts, we have been able to reduce considerably the size of the volume.

Yours respectfully,

KENYON L. BUTTERFIELD,

Superintendent.

AGRICULTURAL COLLEGE,
May 1, 1897.

GENERAL REPORT OF INSTITUTE WORK

FOR SEASON 1896-97.

KENYON L. BUTTERFIELD, SUPERINTENDENT.

The work of the second season under the present Institute law has been in the main extremely satisfactory. In but a few cases was there lack of interest in planning the Institutes, and in many instances there was manifested positive enthusiasm. In fact the general sentiment among the farmers has been of the warmest friendliness toward the work.

The attendance has been satisfactory as compared with last year; yet there is room for improvement in this respect. Lack of advertising probably has something to do with this.

The details of our work have been much improved. Fewer subjects on the program and consequently more time for discussion, greater promptness in carrying out the program, better advertising, and in general a better management of the whole Institute, have, we believe, characterized our Institutes this year as compared with last.

OUR OBLIGATIONS.

Too much credit cannot be given to the many earnest officers of Institute societies, some of whom devoted days and even weeks of valuable time to making the Institutes a success.

Our thanks are also due the newspaper fraternity in general for their public spirit in advertising and reporting the Institutes. With hardly an exception they gave freely of their space, and were a strong factor in the success of the meetings.

We are also under the greatest obligations to the railroads of the State for their grant of half rates to our workers, and for the uniform courtesy and promptness with which their business relations with us have been characterized.

Special features of our work will be treated under separate heads.

CONFERENCE OF INSTITUTE WORKERS.

Friday, Nov 20, all of the Institute lecturers employed by the Board of Agriculture met at the College for a conference upon subjects connected with the details of Institute work. It was voted a most valuable meeting, and unquestionably told materially upon the character of the work we were able to furnish the people. The following program will show the scope of the conference:

PROGRAM OF CONFERENCE OF MICHIGAN FARMERS' INSTITUTE WORKERS, AGRICULTURAL COLLEGE, FRIDAY, NOVEMBER 20, 1896.

Afternoon, Agricultural Laboratory.

1:45—Introductory, Hon. C. J. Monroe, President of the Conference.
2:00—Model lecture, Prof. Clinton D. Smith.
2:20—Model discussion, carried on by workers.
3:00—Criticisms and comments on the above.
3:15—Brief discussions on the following topics:
1. Illustrating lectures, Dr. W. J. Beal.
2. Adapting lectures to locations, Prof. L. R. Taft.
3. How to draw out discussion from the farmers, Hon. Wm. Ball.
4. State workers aiding in discussions, Mr. Roland Morrill.

3:45—The duties of the conductor, Hon. Chas. W. Garfield.
General discussion.

Evening, College Chapel.

7:00—Miscellaneous topics for ten minute discussions:
1. The question box, Mr. R. M. Kellogg.
2. Getting acquainted with the farmers, Mr. I. N. Cowdrey.
3. Women's sections, Mrs. Mary A. Mayo.
4. Advertising M. A. C. and Experiment Station, Prof. C. D. Smith.
5. Granges and Farmers' Clubs, Hon. Chas. W. Garfield.
6. Railroad and hotel rates, and accounts, the Superintendent.

8:00—Institute principles and practices in several states, Kenyon L. Butterfield.
Discussion.

ANNIVERSARY MEETINGS.

January 11-12, 1876, were the dates of the first Farmers' Institutes held in Michigan, Allegan and Armada both having meetings at that time. It was thought fitting to celebrate the coming of age of the work by special exercises. Allegan and Armada were without difficulty induced to hold their Institutes on these dates (Armada preferring the 12th and 13th), and each devoted an evening to an anniversary meeting. We publish so much of the proceedings as space allows:

ALLEGAN.

The anniversary session was presided over by Gen. B. D. Pritchard, who was chairman of the first Institute ever held here. In his opening remarks he explained why he was present in the capacity in which he was acting, and briefly reviewed the history of the initial farmers' gatherings.

The following paper was then presented:

THE STARTING OF THE FARMERS' INSTITUTES.

DR. R. C. KEDZIE, AGRICULTURAL COLLEGE.

Twenty-one years ago to-day the first Farmers' Institute was held in this place, a corresponding Institute being held at the same time in Armada. These Institutes were the inauguration of a class of farmers' meetings that have been held every winter in Michigan since that date, and have spread into nearly every state of our Union, and into some foreign countries. They have continually increased in popular favor and no state has abandoned them after giving them a fair trial. The good that has been accomplished through the Farmers' Institutes cannot be told by words or measured by figures; they have come to stay, and they will shed the dew of their blessing upon our people when the method of their origin shall be forgotten.

It is fitting therefore on this twenty-first anniversary of the Institutes and at this place where they were first placed on trial, to look back upon their starting, and trace some of the influences that brought the Farmers' Institutes into being as a force in the agriculture, the horticulture, as well as the social life of Michigan.

PRELIMINARY DISCUSSION.

The legislature of 1855 passed "An act for the establishment of a State agricultural school," "by the name and style of the Agricultural College of the State of Michigan."

Section 1. The People of the State of Michigan enact, That the President and Executive Committee of the Michigan State Agricultural Society be, and are hereby authorized to select, subject to the approval of the State Board of Education, a location and site for a State agricultural school within ten miles of Lansing; and, subject to such approval, contract for and purchase for the State of Michigan such lands, not less than five hundred acres nor more than one thousand acres, in one body, for the purpose of an experimental farm and site for such agricultural school.

In 1855 Ingham county was nearly an unbroken wilderness. The selection of a site for an agricultural college in a new and unimproved section of the State gave great offense to the older counties where farming was well advanced and prosperous. "Why plant an agricultural college and experimental farm in the woods, and ignore the portion of the State where alone successful farming has been and will be carried on?" The southern counties were seriously offended by the selection, and consequently were hostile to the College before it was born. This unfriendly feeling in the very section where the College ought to have its warmest friends and most earnest supporters, was a heavy load for the College, and hampered its usefulness for many years. How to remove this unfriendly feeling, and how to bring the College into closer touch with the farmers of our State, were matters of earnest discussion in the faculty for many years.

Among the plans proposed was one for holding public meetings in different parts of the State, inviting the coöperation of the farmers. As usual there was a diversity of opinions; some said our work was to carry on the College, and instruct the students that came to us, and not to hold protracted meetings in the rural districts; others felt that we had work enough on hand, and we would only weaken our efforts by attempting more.

The reply to these objections to any new departure in college work was, that the fact of our having an average attendance of only 137 students after the College had been running more than fifteen years, that the leading farmers of the State held aloof from the College, and took no interest in our work, and that the best agricultural counties held the fewest friends of the College, were evidence that the College came short of its duty to the agricultural classes. *We must come into closer touch with the farmers of Michigan.*

The faculty, however, viewed such new line of work as hazardous, and failure would be disheartening. Nothing was done till May, 1875, when the following resolutions were presented at a meeting of the faculty of the College, held May 7, and unanimously adopted:

Resolved, That a committee of three be appointed by the President to draw up a scheme for a series of Farmers' Institutes to be held in different parts of the State during the next winter; including in the exercises of such Institutes, lectures and essays by members of the Faculty; that the several members of the State Board of Agriculture, and leading farmers residing in the vicinity of the place of holding such Institutes, be respectfully and earnestly requested to participate in the exercises by lectures, essays and discussions.

Resolved, That said committee be instructed to confer with the State Board of Agriculture, at its next meeting, to make all necessary arrangements for inaugurating and carrying out such series of Farmers' Institutes.

President Abbott appointed as such committee, R. C. Kedzie, W. J. Beal and R. C. Carpenter. This committee drew up a memorial to the State Board, which was presented at their meeting June 1, 1875—

MEMORIAL.

"*To the Honorable Board of Agriculture:*

"At a meeting of the faculty of this College, held May 7, it was unanimously resolved that a committee be appointed by the President to draw up a scheme for a series of Farmers' Institutes to be held under the supervision and direction of the State Board of Agriculture, in different parts of the State during the coming winter; that the exercises of such Institutes shall consist of lectures, essays, and discussions of previously selected topics; that the several members of the Board, and leading farmers residing in the vicinity, be invited to take part in all such meetings, and the members of the faculty will take such part as the Board may think best.

"It was also resolved that the committee confer with the Board at its next meeting and arrange for such a series of Institutes.

"In accordance with these resolutions, the undersigned were appointed a committee to place the matter before the Board of Agriculture, and to ask you to inaugurate and carry forward such a series of Farmers' Institutes during the coming winter.

"Whatever may be the cause, we think the *fact* is sufficiently evident that there is a want of sympathy between the farmers and the Agricultural College. By reason of this want of sympathy the farmers are deprived of much of the good which they may secure from the Agricultural College, and which they have a right to demand; and the College is crippled in its work for the same reasons.

"We believe that this want of sympathy and lack of interest are because the farmers, as a class, know but little of the real working of the College, and that if the Board and faculty could be brought into more intimate association with farmers in all parts of the State, these evils might be removed. If the College is not doing such work as ought to command the confidence of intelligent farmers in all parts of our State, then our system should be altered so as to meet the just demands of the farmers; if we are doing such work, we may still fail of our duty, if we fail to make this fact known. There is something wrong when the College, after 16 years of continuous work, is still denounced and decried in some of the most flourishing agricultural sections of our State.

"We therefore ask the Board of Agriculture, who are the agents of the people to manage and control the College for the good of the whole State, to arrange for holding six Farmers' Institutes during the month of January, 1876. These meetings should be understood to be the first of a series of meetings which will be held winter after winter, if the interest of the agricultural public shall warrant. These first meetings should be held in the older-settled portions of the State.

"We ask the Board of Agriculture to take upon themselves the responsibility of the whole thing; to invite speakers, essayists, and persons to lead off in discussion on topics selected and announced in advance; to preside at such meetings or to select presiding officers, and to make all arrangements necessary to make these Institutes a success. We would also respectfully suggest that each Institute begin with an evening meeting, with an address and topic for discussion, and that the next day be entirely given up to the work of the Institute, to close with a meeting on the evening of the second day. Two such Institutes could be held in each week, and the whole concluded in three weeks, beginning with January 10.

"The members of the faculty will take such part in the meetings as the Board may deem advisable, but we would suggest that not more than two members of the faculty take part in any one meeting. One essential element of success will be to secure the active coöperation, by addresses, essays and discussions, of leading farmers in the region in which the Institute is held. The Institutes will be feeble

in interest and impotent for good without such active assistance of representative farmers.

"The length of time assigned for an Institute may seem short, but brief, spicy, and wide-awake meetings will more naturally be secured, and if the time is too short as shown by experience, it may be extended hereafter. Better too short than too long.

"We also suggest that a competent reporter be employed to prepare an extended report of these meetings for insertion in the Annual Report.

"Invitations for such meetings should be secured through Farmers' Clubs, Granges, etc. If these Institutes are held because *the people ask for them*, the influence will be much better.

"The local expenses of such Institutes should be borne by the people of the vicinity, *e. g.*, for hall, fire, lights, etc.

"Such is a brief outline of the subject. There may be many crude and impracticable ideas embraced in our scheme, but we want the College and the farmers to come nearer to each other, to be a mutual benefit to each other, and to see the College take such a position in agriculture and associated arts that it shall be the pride and boast of the farmers of every section of our State.

"We very well know that in requesting the Board to inaugurate such a series of meetings, and to take the control and guidance of the same, we are asking you to assume an onerous responsibility. But the State authorities, in placing you as the responsible head of the Agricultural College, have thereby placed you as the leaders of the agricultural educational interests of the State. By your position you must take the lead in all efforts which aim to develop an intelligent interest in whatever shall benefit this overshadowing industry. Compared with our agriculture, all other productive industries in our State must speedily take a secondary position. Our lumbering will soon cease, for the axe and the saw will soon have done their work. Mining, itself, must take a subordinate position in our State, but our agriculture will go on increasing in extent, variety, and absolute value to the end of time. The farmers of our State have therefore a right to demand for themselves and for their calling all that is most helpful and stimulating to aid this great industry; and the Agricultural College, and all connected with it, will fail of their duty if they are not foremost in every movement which shall tend to the improvement of agriculture."

Respectfully submitted,

R. C. KEDZIE,
W. J. BEAL,
R. C. CARPENTER,
Committee.

AGRICULTURAL COLLEGE,
June 1, 1875.

The Board listened to the memorial with deep interest and fully realized how helpful the scheme would be if successful. But success depended not alone on the Board and College, but also upon the hearty coöperation of the farmers who heretofore had shown little confidence in the College or sympathy with its work. The Board would welcome success, but, like some of the faculty, dreaded failure which would sink us lower still. They realized that "nothing succeeds like success," and equally the converse, "nothing fails like failure." A lengthy discussion followed, when Mr. Geo. W. Phillips, member of the Board from Macomb county, asked, "What would you call a success in this new departure?" The answer was, "If fifty leading farmers will attend the Institute, take part in its exercises and feel that they have received benefit from it, I would call the Institute a success." "Then I go in for the Farmers' Institutes, and I want the first one held in Armada, and I'll see it is a success." He got the Institute and kept his word, two Institutes being held the same date on opposite sides of the State.

With some misgivings the State Board adopted the plan and appointed Messrs. Childs, Dyckman and Gard a committee to arrange for six Farmers' Institutes to be held in January, 1876, and to assign the members of the faculty to take part in them. And this was the starting of the Farmers' Institutes. * * * *

The public took up the plan for these meetings in a generous spirit. Applications came in large numbers for the Institutes, and before the meeting of the Board in November when final arrangements were made, more than thirty applications were on file. The embarrassing consideration was not to find a place where we could go, but what places to leave out. The public was ready for the new departure, and looking back 21 years it is hard to believe that serious doubts were entertained about their success.

Two Institutes were held in the eastern, two in the western, and two in the southern parts of the State. In the western division two persons took hold of the matter with enthusiasm, E. C. Reid of Allegan, and Capt. Hendryx of Decatur, not only securing an Institute for their locality, but working up the subject with such energy as to compel success.

THE FIRST INSTITUTE IN ALLEGAN.

The College team sent to the Allegan Institute consisted of Profs. Fairchild, Cook, and Kedzie, and R. C. Carpenter. The President of the Institute was Gen. Pritchard, and Secretary, E. C. Reid—guarantees of the success of any meeting. The first meeting was Jan. 11, 1876, twenty-one years ago this evening, Gen. Pritchard being detained by unavoidable business, Hon. Thomas Shepherd presided.

Rev. J. Sailor conducted the opening exercises, after which Prof. Fairchild delivered a lecture, "Education; Who Need It and Who Can Afford It," following which an essay by Henry I. Clubb on "Fruit Growing in Michigan," was read by Secretary Reid.

The next morning Dr. Kedzie gave a talk on "Lightning Rods," and a lecture on "Muck;" and Mr. Julius Tomlinson read an essay on "Shall Farmers Keep Bees?" which was full of sharp points and sweetness; Mr. William Cummings followed with an essay on "Long-Wooled Sheep."

In the afternoon Prof. Cook gave a lecture on "Fruit or Insects—Which?" Mr. J. A. Anderson followed with a paper on "Breeding and Feeding Swine;" Mr. Henry Shultes then read a paper on "Raising Hay and Fattening Cattle," which closed the exercises for the afternoon.

The closing session of the Institute was Wednesday evening, when R. C. Carpenter gave a lecture on "Road Making;" Mr. Richard Ferris then read a paper on "Cutting and Curing Hay." The closing exercise was an essay by Hon. A. S. Dyckman, member of the Board, on "Thinning Fruit."

The essays and papers contributed by the farmers of Allegan and vicinity were valuable and timely, and elicited valuable discussion in every instance. The meetings were crowded, and the interest unabated from first to last. The Institute was a success.

Volunteer speeches were called for from those who were present twenty-one years ago. A number responded. N. W. Lewis remembered Dr. Kedzie's lecture on muck lands, illustrated with samples, and believed that the draining of the great swamp in the western part of this county was one of the direct results of it. Previous to that time, muck lands were considered worthless except for fertilizers. Geo. W. Grigsby remembered the muck lecture better than other events of the Institute, and believed he had profited by what he heard then. J. B. Buck, though a young boy, was present with his father, and remembered the talks on muck lands and lightning rods, the latter of which created considerable general interest at the time. Copies of that address were distributed last Monday at the close of the evening meeting. President Robinson was one of the "originals," and spoke briefly. O. L. Holton was another, and the lightning rod and muck land lectures were most distinctly remembered. H. H. Pope gave some reminiscences of that meeting. Dr. Kedzie said that Allegan county had always been in sympathy and coöperation with the College. Her boys had been sent there, and all had proved an honor to that institution and to the county. L. A. Lilly, W. B. Williams, H. H. French, F. L. Hickok, J. H. Brown, E. A. Post, and T. G. Adams, none of whom were at the first Institute, made brief remarks along the lines under discussion. Mr. Lilly was a student at the College at the time, and the only one from this county.

ARMADA.

The Hon. Geo. W. Phillips, who presided at the Institute at this place in 1876, was in too poor health to be present, much to the regret of his many friends. Dr. Beal's article explains details of the first meeting.

TWENTY-ONE YEARS OF INSTITUTE WORK.

DR. W. J. BEAL, AGRICULTURAL COLLEGE.

On January 8, I received a letter from Hon. Chas. W. Garfield containing, among other things the following: "In a moment of good nature which was inexcusable, I agreed with Kenyon Butterfield to attend the anniversary of our first Institute at Armada. It transpires that the date conflicts with a former engagement to speak at a meeting of the New Jersey Board of Agriculture.

"Now, my dear friend, you will remember that I attended the Armada meeting twenty-one years ago as your substitute. Can not you pay me back in my own coin and be my substitute at this anniversary gathering? I know it comes in the midst of college duties that are congested on account of the short courses, but I feel as if no one could do this as well or as appropriately as you.

"It would recall pleasant memories if I were to go, because it was my wedding journey and they gave me quite an ovation.

"I had intended to look up the records of that meeting and speak particularly of Geo. W. Phillips and President Abbott. You could do all this better than I, and you know the evolution of Farmers' Institutes in our State as thoroughly and sympathetically as I. I shall consider it a great favor if you can speak for me on that occasion.

"Yours with anxiety,

"CHAS. W. GARFIELD."

You can see by the letter that Mr. Garfield is a good diplomatist, and this explains why I am here tonight. The theme alloted me seems eminently appropropriate to the occasion—"Twenty-one years of Institute work."

Of the four speakers who were first assigned to attend this Institute in January, 1876, as representatives of the College, three have gone to their long home, viz.: President Abbott, Professor A. B. Gulley and Mr. C. L. Ingersoll. I alone am left. One of the substitutes for that occasion, Secretary Baird, and Mrs. Alice Garfield, the young bride of the other substitute, have also crossed the river.

Let us glance at a catalogue of the Agricultural College for the year 1876.

Among the names of the members of the State Board of Agriculture was that of Hon. George W. Phillips, chairman of one of the first Farmers' Institutes of Michigan. He served from 1871 to 1883, a period of twelve years, and performed his duties with earnestness and eminent success, well nigh to devotion. At that time there were ten professors and assistants on the faculty roll and 164 students. Of these ten persons, only two are left, Dr. R. C. Kedzie and the person who addresses you; four of the remaining eight have died, three resigned to accept positions commanding better salaries.

In 1876 Dr. T. C. Abbott was president of the College, and in the prime of a busy and useful life. The College was most fortunate in retaining his services for a period of nearly thirty years—in fact his name appeared as a member of the faculty for thirty-one years. He served as president for twenty-two years, while for the other eighteen years six different persons have served as president.

Alfred B. Gulley, another member of the faculty delegated to speak at the first Institute at Armada, was professor of agriculture for nearly two years and resigned at his own suggestion to resume work on his farm. He was a most genial man, who rarely, if ever, made an enemy, while his warm friends were numerous.

He was succeeded by C. L. Ingersoll, who served as foreman and professor of agriculture for a period of four years.

In 1876, and for many years after, only six Institutes a year were held, with a very small fund for defraying some of the expenses, but for last year and the present year $5,000 per year have been placed in the hands of the State Board of Agriculture for conducting seventy or more Institutes annually.

Another improvement is worthy of especial mention. The numerous Institutes cannot be entirely supplied with speakers from the College faculty, as they must teach their classes at the College. To supply this deficiency, if we may be warranted in calling it a deficiency, a goodly number of bright and successful men and women from various portions of the State are employed to present topics with which they are most familiar, not only at numerous Institutes, but some of them to the agricultural classes at the College. The Institute work, like the Farm Home Reading Circle, must be considered in the line of college extension work—legitimate work carried to the neighborhoods where farmers live.

In glancing at the topics which were placed on the program of the first Farmers' Institute, we find them much the same as topics discussed today. There has been some progress, but young people are all the time taking the places of those who have retired from active life, and the old, old stories must be repeated at Institutes.

The method of conducting Institutes has been considerably improved, and the expenses for securing the same amount of good work have been diminished. This has been accomplished by employing a superintendent who attends to many details heretofore delegated to a number of other people who did not always act on the same plan. The railroads of the State grant half fare; one crew or company of persons pass from place to place in a certain section of the State and save expense of time and money and worry. More attention has been given to illustrations and exhibits at Institutes; the cooking school as a section for instructing the women has been found successful,—also the section for women, in which they discuss topics of especial value to themselves and their children.

Although Institutes have now been held for twenty-one years, Michigan has been rather conservative when compared with some of the neighboring states. Our Institutes are run on the cheap or economical plan.

In my own work at Institutes, I have been diligently scattering grass seed all over the southern peninsula for twenty-five years. Much of the seed must have possessed low vitality, or it must have fallen on poor soil,—at least the good results that I anticipated have been slow in arriving. In a few places enough have grown to produce fine mixed meadows and pastures.

During these twenty-one years the farmers of Michigan have been gaining, and this gain can be attributed to many causes. They have had the benefits accruing from Farmers' Institutes, numerous prosperous granges, and more recently from numerous farmers' clubs. A few self-sacrificing members of the State Horticultural Society, including several professors of the Agricultural College, have gone from county to county holding excellent meetings in which fruits and flowers were topics in the programs. The reports have been ably edited for the benefit of all horticulturists in the State. No state has ever been more fortunate than our own in having such able and public-spirited men as Hon. T. T. Lyon and Hon. C. W. Garfield, not to mention a good number of others who have been doing and are still doing noble work of this kind.

With the courses at the Agricultural College, with Institutes, granges and clubs and State Horticultural Society and State Dairymen's Association, with experiments and bulletins, reading circle, agricultural fairs and the improved agricultural press—unless there are some gross blunders and calamities unforeseen, the studying farmer must rise and soon enter a new era full of promise.

A LETTER FROM MR. W. E. DAY.

A letter from Mr. J. E. Day was read by his son, W. E. Day, as follows:

Mr. President and Members of the Institute:—In striving to recall the persons and events of the Farmers' Institute of twenty-one years ago, I find great difficulty in singling out of the general mass of recollection such individual items as may be of interest and profit to those present, for I realize that the Institute of today is composed of a different people from that of almost a generation ago. So I may touch most lightly upon those topics which seem to you to be most important, and magnify the unimportant ones.

First, let me speak of the personnel of that meeting. I remember most distinctly and most pleasantly the genial chairman on that occasion, Hon. Geo. W. Phillips. Who that attended that meeting could forget him? He was among

kindred spirits. The members of the College who were present were personal friends of him, and he had the wonderful tact to know just when and how to touch them to get out the best that was in them. By his own good feeling, and rare judgment of the nature of others, he placed these gentlemen in the most cordial relationship with those they came to instruct. If there was any fear on the part of the farmers that these members of a college might regard themselves as belonging to a sphere a little above the one they occupied; or that the farmers might regard these men as devoted to a theory, at the expense of the practical, all this was dissipated, and the collegians and farmers engaged in the labor of the Institute on the most friendly terms. Then that meeting was composed of his neighbors, men in whom he had the utmost confidence, and they in him. Furthermore, the Institute was the development of a plan he had helped to mature. * * * It is with profound sorrow that we now know of his present infirmity. Yet the same zeal for your good, and the same kindly feeling actuates him now as then. May he be cheered by the knowledge that many of his fondest hopes have been realized. May his infirmity diminish and his comfort increase as life wears on.

It is with satisfaction also that I recall the rotund figure and hearty laugh of the then secretary, Robt. G. Baird. The geniality with which he greeted every one made an atmosphere of good feeling all around him. Not a practical farmer, yet he abounded in sympathy with all that could elevate them in their profession, or make their life less a drudgery. His articles abounded in the most pleasant kind of wisdom and repartee, and his advice and suggestions were replete with sturdy, practical common sense. We are glad of the influence he exerted, and know it has not been lost upon this community.

Another I shall remember as long as life shall last, was Hiram Barrows (whose photograph lies before me as I write). He had a pleasant smile and a cheerful word for each, and he seemed to regard it as his especial mission to see that every one had every comfort possible for him to bestow. All who came within the circle of his influence went away the better for it, and all members of the Institute knew that he had a worthy champion in Capt. Barrows. Armada village is rich in the memory of such a man, and will never get beyond the influence of his life.

I remember also Mr. J. H. Phillips, Mr. Goyer, Mr. Carter, Mr. Granger, and probably there were others, who by their presence, their wisdom, and the nobility of their lives, added to the interest, and added to the profit of the occasion. Their memory is with us as an abiding inheritance, but their voices we may hear no more. Were they here today they would rejoice with us that we have "builded better than we knew."

As I think of that meeting as a whole it seems to me that it is seldom that so high an average of intelligence and sterling good sense is found in a meeting of farmers or of any other class of citizens. Ready they were, not only to adopt suggestions, but just as ready to offer the results of their own experience for the benefit of other lives—not only willing to take, but willing to give. This constituted a large element of success in that meeting.

Possibly my love for the neighborhood of my birth, and the scene of most of my active life, may have biased my judgment, or possibly repeated Institutes held since that time, have made such a degree of intelligence only a common thing. But until proof to the contrary is at hand, I shall adhere to the first statement.

What have been the results of that long-ago Institute? It was an experiment at best. Would the farmers profit by them? Would they support them? Or would they cling to the old ways, and continue to do thus and so simply because their fathers had done so. As I sometimes visit the old neighborhood, which I am still proud to call home, I am made conscious of a great many changes. Nature has wrought some of these, but intelligent methods in agriculture, and a wise use of means to a definite end, have done more. Roads are better—and good highways mark the degree of advancement in any community. Buildings have grown better, stock is improved, fields are cleaner and better drained, and schools and churches are better attended, and all the amenities of modern civilized life have been augmented. What has done it? Now I am not vain enough to suppose that it was on account of anything I might have said, because, if I remember rightly, I was severely criticised. Nor yet was it on account of any special thought of some one else alone. But I do know that influences were set in motion that have resulted in what we see today. People were led to think, and thought blossomed in action, and the fruit is being gathered now. Thought may be sometimes expensive, and experiment often costly, but in this way lies advancement, and if it costs much it is likely to be longer remembered and more highly prized.

THE LONG INSTITUTES.

The four-day Fruit Institute held at Shelby, Oceana county, was a success, and demonstrated afresh the value of what we term the "Long Institute." The three-day Dairy Institute held at Hastings was not a success in point of attendance, but the program gave good satisfaction. A glance at the program of these two Institutes will show the scope and plan of the work attempted.

PROGRAM—LONG FRUIT INSTITUTE.

AT SHELBY, OCEANA CO., DECEMBER 15, 16, 17, 18, 1896.

HON. CHAS. W. GARFIELD, CONDUCTOR.

TUESDAY, DECEMBER 15—FORENOON.

10:00—"Peaches and Plums; Locating and Planting the Orchard" ..... Roland Morrill
11:00—"Forecast of Frosts" ..... *Dr. R. C. Kedzie

AFTERNOON.

1:00—"Diseases of Small Fruits" ..... Prof. L. R. Taft
2:00—"The Relation of Bees to the Fertilization of Flowers" ..... Prof. W. B. Barrows
3:00—"Water in Physics" ..... Prof. P. B. Woodworth

EVENING.

7:00—Address of Welcome ..... F. W. VanWickle
Response ..... Hon. C. W. Garfield
7:30—Discussion of Road Question, conducted by Hon. F. J. Russell. Papers by Geo. C. Myers and B. S. Garver.

WEDNESDAY, DECEMBER 16—FORENOON.

10:00—"Peaches and Plums; Cultivation and Care" ..... Roland Morrill
11:00—"The Simpler Chemistry of the Soil" ..... Dr. R. C. Kedzie

AFTERNOON.

1:00—"Diseases of Pome Fruits" ..... Prof. L. R. Taft
2:00—"A few Insect Enemies of the Apple and Pear" ..... Prof. W. B. Barrows
3:00—"Water in the Air" ..... Prof. P. B. Woodworth

EVENING.

7:30—"Is Our Present School System too Expensive?" ..... Dr. R. G. Cavanagh
"Practical Education vs. Theoretical Teaching" ..... Hon. J. F. Widoe
"How Much Should the Country School Teach?" ..... F. W. VanWickle

THURSDAY, DECEMBER 17—FORENOON.

10:30—"Peaches and Plums: Marketing" ..... Roland Morrill
11:00—"Soil Exhaustion" ..... Dr. R. C. Kedzie

AFTERNOON.

1:00—"Diseases of Stone Fruits" ..... Prof. L. R. Taft
2:00—"Some Insects Attacking Peaches and Plums" ..... Prof. W. B. Barrows
3:00—"Water in the Soil" ..... Prof. P. B. Woodworth

EVENING.

7:30—Topic, "The Farm Home." Conducted by Major G. W. Woodward. Papers by Mrs. T. S. Gurney and Frank Evans.

FRIDAY, DECEMBER 18—FORENOON.

9:00—Business Meeting.
10:00—"Peaches and Plums: Varieties" ..... Roland Morrill
11:00—"Feeding the Soil" ..... Dr. R. C. Kedzie

AFTERNOON.

1:00—"Treatment of Plant Diseases" ..... Prof. L. R. Taft
2:00—"The Natural Enemies of Insects" ..... Prof. W. B. Barrows
3:00—"Water in Plants" ..... Prof. P. B. Woodworth

Lectures will be thirty minutes long. A general discussion will follow each lecture.
Both the day and evening programs will be interspersed with good music.

* Dr. Kedzie's lectures at this meeting will be found in full elsewhere in this volume.

PROGRAM—LONG DAIRY INSTITUTE.

AT HASTINGS, BARRY COUNTY, DECEMBER 15, 16 AND 17, 1896.

PROF. C. D. SMITH, CONDUCTOR.

All the State speakers were from the Agricultural College, except Mr. A. M. Welch, Ionia.

TUESDAY, DECEMBER 15—FORENOON.

10:00—"The place of the Dairy on the Michigan Farm,"..... Prof. C. D. Smith
11:00—"Combined use of the Babcock Test and the Observation of Dairy Form in Selection of Cows," Mr. G. H. True

AFTERNOON.

1:00—"Shall we Buy or Raise our Cows?"..... Mr. A. M. Welch
2:00—"Stall Fixtures,"..... Prof. C. D. Smith
3:00—General Discussion and Question Box on the above topics.

EVENING.

7:00—Local Program,..... Miss Flora Beadle, Commissioner of schools, Barry County
8:00—"Dairy Chemistry," Illustrated with Stereopticon..... Prof. F. S. Kedzie

WEDNESDAY, DECEMBER 16—FORENOON.

10:00—"The Principles of Stock Feeding,"..... Prof. C. D. Smith
11:00—"Silo Construction,"..... Mr. A. M. Welch

AFTERNOON.

1:00—Business Meeting, Election of Officers, etc.
1:30—"Feeding the Herd in Dry Years,"..... Mr. G. H. True
2:30—"Growing the Silage and Filling the Silo,"..... Mr. A. M. Welch
3:30—Discussion and Question Box on Feeding and Care of Dairy Stock.

EVENING.

7:00—Local Program.
8:00—"Dairy Bacteriology," Illustrated with Stereopticon..... Mr. C. E. Marshall

THURSDAY, DECEMBER 17—FORENOON.

10:00—"Winter Feeding, with and without Silage,"..... Mr. A. M. Welch
11:00—"The Home Dairy vs. the Factory,"..... Prof. C. D. Smith

AFTERNOON.

1:00—"The Art of Butter Making,"..... Mr. G. H. True
2:30—A General Discussion of the Subject of Butter Making.

Lectures will be about 30 minutes long, and full discussion will follow each lecture.
This Institute is designed to cover all phases of dairying applicable to this vicinity. In order to get the best of the Institute, it is necessary that those interested should be present every day of the sessions.

THE ROUND-UP.

Pursuant to the general policy of the Board of Agriculture in moving Institutes from place to place, the Round-up was this year held in St. Louis, Gratiot county. The local arrangements were well attended to. The attendance was considerably larger than at Grand Rapids, but the number from outside the county was considerably smaller. A woman's section was held each afternoon. A report of this Round-up comprises a large portion of this bulletin.

One of the most profitable features of the gathering were the conferences held. Each morning of the meeting there was held a conference of Institute lecturers, to discuss the lessons of the winter's work. Each afternoon after the session of the Institute the officers of county Institute

societies who were present held a conference to discuss methods of advertising, preparing programs, and similar topics. Great good resulted from these conferences, and we regretted that there were not more Institute society officers present to enjoy and profit by them.

ONE-DAY MEETINGS.

The experience of last season convinced us that the chief fault of our Institute system is the simple fact that it does not reach as many people as it should; it oftentimes does not reach the very people who most need its influence. This can be truly stated without in the least reflecting on the management of any one Institute. The very fact that but one Institute is held in a county each year, the added fact that every Institute draws the bulk of its attendance from a distance not to exceed five miles, makes it simply impossible for us to cover a county under the present plan. How to obviate this weakness without enormously increasing the cost is the problem. It occurred to us that the solution might lie along the line of supplementing the regular county meeting with a series of one-day meetings, scattered about the county, chiefly in localities unlikely to obtain the regular county meeting for at least some years. To demonstrate either the value or worthlessness of such a plan, we determined upon an experiment in two counties. We chose Ionia and Sanilac counties, securing without difficulty the hearty coöperation of the officers of the Institute societies in both counties. Five one-day meetings were held in each county, as follows:

In Ionia county—

Portland, Monday, January 18; North Plains, Tuesday, January 19; Belding, Wednesday, January 20; Clarksville, Thursday, January 21; Lake Odessa, Friday, January 22.

The county meeting followed the next week at Ionia.

In Sanilac county the meetings were—

Brown City, Tuesday, February 1; Sanilac Centre, Wednesday, February 2; Argyle, Thursday, February 3; Minden City, Friday, February 4; Port Sanilac, Saturday, February 5.

The county meeting was held at Croswell the week following.

But one State speaker was sent, in each case Hon. Wm. Ball being the lecturer requested. The programs were like the usual Institute program. In Ionia county the secretary personally made local arrangements at each point, with the aid of vice-presidents and committees. At the time of holding the Institutes both the president and secretary *attended each meeting.* In Sanilac county the local arrangements were made through a sub-society at each point. The table below will give an idea of the value of the experiment.

SYNOPSIS OF INSTITUTE WORK IN IONIA COUNTY, 1896 AND 1897.

1896.

One-day meeting at Ionia; average attendance per session, 435.

1897.

There was held one three-day "County Round-up" at Ionia, with 332 average per session;
Also five one-day meetings, as follows:

Place.	Sessions.	Total attendance.	Average per session.
Portland	3	780	260
North Plains	2	225	113
Belding	3	885	295
Clarksville	3	600	200
Lake Odessa	3	570	190
Total		3,060	1,058

Average attendance per session for these five meetings..... 212
Average attendance per session at 68 Institutes, 1895-6..... 223

The extra cost to the State of the five one-day meetings was $27.00, or approximately $5.50 per meeting.

SYNOPSIS OF INSTITUTE WORK IN SANILAC COUNTY, 1896 AND 1897.

1896.

Held a two days' meeting at Sanilac Center, average attendance per session 200.

1897.

Held a three days' "County Round-up" at Crosswell, average per session 318.
Also five one-day meetings as follows:

Place.	Sessions.	Total attendance.	Average per session.
Brown City	3	775	255
Sanilac Center	2	225	108
Argyle	2	300	150
Minden City	2	275	137
Port Sanilac	3	425	162
Total		2,000	812

Average per session for the five one-day meetings..... 162

The extra cost to the State was $37.00, or approximately $7.50 per meeting.

As to the opinion of the people, we quote the following from a letter written by the president of the Ionia County Institute Society, Mr. Luther E. Hall, Ionia:

"I regard the Institute work in our county as highly satisfactory, and considering the cold weather at Odessa, Friday, and at Ionia, the next Monday and Tuesday following, the attendance was as good as could be expected. The attendance at Ionia on Wednesday was very good, indeed.

"Taking it as a whole, I believe we reached at least twice and perhaps twice and one-half times as many with the series of one-day Institutes as we would without them.

"At Portland, Belding, and Clarksville the interest was very warm. There is also an earnest desire for a meeting at South Boston Grange hall next year."

Also from the secretary, Mr. C. I. Goodwin, Ionia:

"For myself, if I could only have one, I would take the series of one-day Institutes instead of the county Institute, because you reach more people and a class you could not reach in any other way, as you take the Institute to them and they are the ones most in need of help and inspiration.

"It may take time to work out the plan in all its details but I believe it is a step in the right direction, and the farmers of Michigan will make a great mistake if they fail to secure such legislation as will secure its adoption.

"Without looking up the figures and casting an average, I would say we reached more than half as many people at each one-day session as we did or could expect to in a two or three-day county Institute. At least 90% of those who attended the one-day meetings could not have been prevailed upon to attend the regular county Institute."

Hon. Wm. Ball, who was the State speaker at all the one-day meetings, says:

"My opinion has for a year or more been inclining towards one-day Institutes. The interest as a whole in these meetings has been beyond my expectations."

Also the following:

[Sanilac County Republican, Feb. 12, 1897.]

The farmers of Sanilac county made good use of the opportunities furnished them this week by the State Agricultural Department, through the splendid series of Institutes held at Brown City, Argyle, Port Sanilac and Croswell. Large attendance, great enthusiasm, bright and able papers, and profitable discussions marked every meeting. It is plainly evident that these Institutes are inaugurating a new era for the agricultural interests of this county, and it is to be hoped that the good work so well begun will be continued with even greater zeal, if that be possible. The Institutes appear to be furnishing the farmer with an inspiration and enthusiasm that they very much need just at present.

The above quotations represent fairly the sentiment in both counties, so far as we can determine it.

Our own opinion is that we have solved the problem; that a combination plan of holding five or six one-day meetings in a county, and following later with a longer county meeting, is almost ideal. We believe that with $1,000 extra appropriation per year we can hold at least 100 one-day meetings each winter, and thus nearly double our efficiency.

WOMEN'S SECTIONS.

A women's section was held in connection with 56 Institutes the past season; at seven others the State furnished a lady speaker for the regular sessions. At most Institutes where women's sections were held the lady speaker sent by the State to conduct the women's section also appeared on the general program. While in a few instances there have been objections to the separate sessions for women, the general sentiment, especially among the women themselves, is heartily in favor of a continuance of the women's sections. The following shows the places where women's sections were held, and the attendance:

Women's Sections at Farmers' Institutes, Winter of 1896-97.

County.	Place.	Attendance.	County.	Place.	Attendance.
Alcona	Harrisville	47	Lake	Chase	83
Allegan	Allegan	106	Lapeer	Lapeer	211
Alpena	Alpena	116	Lenawee	Adrian	225
Antrim	Mancelona	35	Livingston	Howell [1]	----------
Arenac	Standish [1]	----------	Macomb	Armada	200
Barry	Hastings	----------	Manistee	Copemish	66
Bay	Auburn	67	Marquette	Marquette [1]	----------
Benzie	Benzonia	48	Mason	Scottville	48
Berrien	Niles	80	Mecosta	Morley	36
Branch	Coldwater	350	Menominee	Stephenson [1]	----------
Calhoun	Albion	250	Midland	Midland	80
Cass	Cassopolis	250	Missaukee	Lake City	32
Charlevoix	East Jordan	32	Monroe	Monroe	72
Cheboygan	Cheboygan	6	Montcalm	Carson City	116
Chippewa	Sault Ste. Marie	52	Muskegon	Muskegon	96
Clinton	St. Johns	56	Newaygo	Fremont	92
Crawford	Grayling	----------	Oakland	Milford	150
Dickinson	Norway [1]	----------	Oceana	Shelby	----------
Eaton	Charlotte	122	Ogemaw	Rose City	68
Emmet	Harbor Springs	45	Osceola	Hersey	46
Genesee	Flushing	225	Oscoda	Mio	----------
Gladwin	Gladwin	60	Otsego	Gaylord	72
Grand Traverse	Traverse City	55	Ottawa	Holland	33
Gratiot	St. Louis	[2] 1,125	Roscommon	Roscommon	52
Hillsdale	Hillsdale	78	Saginaw	Chesaning	125
Huron	Bad Axe	160	Sanilac	Croswell	250
Ingham	Stockbridge	350	Shiawassee	Laingsburg	175
Ionia	Ionia	450	St. Clair	Emmet [1]	----------
Iosco	Tawas City	58	St. Joseph	Three Rivers	400
Iron	Iron River [1]	----------	Tuscola	Vassar	122
Isabella	Mt. Pleasant	99	Washtenaw	Chelsea	350
Jackson	Brooklyn	220	Wayne	Plymouth	350
Kalkaska	Kalkaska	40	Wexford	Sherman	44
Kent	Grand Rapids	150			

NOTE.—Total attendance, 8,326; average per session, 141.

[1] To these places the State sent a lady speaker, but no separate women's section was held.
[2] Four sessions.

COLLEGE EXTENSION WORK.

Another line of work that has been undertaken is best explained by the following circulars, which we reprint in full:

IMPORTANT TO FARMERS.

Extension Lectures in Fruit Growing.

We have arranged with Mr. Roland Morrill, of Benton Harbor, to give a series of lectures, at the points named below, on the subject of "Peach Culture." We believe that by this plan of lectures we can reach people more completely and do more good than can possibly be done at a Farmers' Institute, valuable as an Institute is. Believing this, we desire to experiment a little to find out if our theory is worth anything.

THE LECTURER

Mr. Roland Morrill, is probably known to every fruit grower in western Michigan. He is the president of the State Horticultural Society, and is generally recognized as one of the most successful and progressive peach growers in this country. He is not only thoroughly posted, but he has a delightful way of presenting his experience.

THE TOPICS.

The general topic will be that of "Peach Culture." The idea is to give three lectures at each point on this topic; lecturing the same day of the week at each place, for three weeks in succession. Mr. Morrill has divided the topic as follows:

1. "*Location of orchard and the selection and planting of trees.*"
2. "*Cultivating, pruning, fertilizing, etc.*"

(This lecture will probably be illustrated with stereopticon)

"3. *Harvesting, marketing, and varieties.*"

DATES.

We have arranged for meetings at the following places, and have also arranged the schedule of dates:

Shelbyville, Wednesday, March 10. March 17. March 24.
Wayland, Thursday, March 11. March 18. March 25.
Moline, Friday, March 12. March 19. March 26.
Otsego, Monday, March 15. March 22. March 29.
Martin, Tuesday, March 16. March 23. March 30.

Lectures will begin at 7:00 p. m. except at Moline, where they will begin at 2:00 p. m.

The following gentlemen will have charge of local arrangements at each of the following places. We also designate the place of meeting:

Towns.	Local Manager.	Place of Meeting.*
Shelbyville.	T. G. Adams.	.....
Wayland.	C. A. Clark.	.....
Moline.	F. C. Gilbert.	.....
Otsego.	Geo. D. Higgins.	.....
Martin.	R. Johnson.	.....

* Written in by local managers.

ATTENDANCE AND EXPENSES.

These lectures will be *absolutely free to everyone* wishing to attend. We shall expect that Mr. Morrill will be taken about from place to place, and to visit orchards in each locality. We also expect that arrangements will be made to entertain him en route, and if there is any expense connected with this it must be provided for locally. Otherwise we pay all expenses and everything is free.

CLASSES WANTED.

We wish at each place, it being a part of the "contract," to have a class of at least a dozen, *preferably young peach growers*, who will agree to attend each meeting, to come prepared with note books and pencils, and who will take notes of Mr. Morrill's lectures, and will agree to read a little each day during the week on some subject selected by Mr. Morrill. The lecturer will be provided with horticultural journals and bulletins to distribute, and will ask different members to read special articles and report upon them. There will be nothing at all difficult about this, and those who join the classes will get the greater benefit. The classes are particularly fine, the object in having them being to especially interest and profit the young peach grower. There is no objection, however, to older people being in the classes. We feel that we must ask that a class of at least a dozen be pledged. *But let it be understood that everyone, old or young, men or women, is invited to these meetings.*

DURING THE DAY

Mr. Morrill will visit the various orchards in the vicinity of the place of the lecture. We suggest that the local manager arrange the orchards into groups, so that Mr. Morrill, during the three visits, will have opportunity to visit all the peach orchards in the vicinity. This will be most valuable, as Mr. Morrill will be able to give suggestions to the owners of the orchards, and also to make public certain points that are brought out by his observing the conditions of the orchards.

A REQUEST.

I wish to urge upon every fruit grower the desirability of making these meetings a success. They are wholly an experiment; if successful we shall wish to continue them to some extent. If they are not a profitable means of distributing the best information we shall not try them again. We believe that eastern Allegan county is a good locality in which to try this experiment, and we expect the fruit growers in the communities named to do all in their power to awaken interest and, in general, to make the meeting a complete success.

For further particulars call on the local manager in your vicinity.

KENYON L. BUTTERFIELD,
Supt. Farmers' Institutes.

Agricultural College, March, 1897.

Mr. E. J. French, Otsego, has general charge of local arrangements for these meetings.

Another circular was as folows:

A RARE TREAT.

Extension Lectures for Farmers' Wives.

We desire to call attention to an experiment we are trying in your locality of extending the work of the Agricultural College and Farmers' Institutes. We believe that the Institutes are doing a vast amount of good, but the great lack in them is that they occur so seldom. We believe that the plan outlined below will reach more people more closely than can be done in any other way.

THE PLAN.

The plan of our experiment is this. We have arranged with Mrs. Mary A. Mayo, who conducted the Women's section at the Farmers' Institute at Milford, to give a series of lectures to the women of your locality, on subjects of great interest to the home life of the farm. The idea is that Mrs. Mayo will lecture at each of four points three weeks in succession, lecturing on the same afternoon of each week at each place.

THE LECTURER.

Those who attended the Institute at Milford do not need an introduction to Mrs. Mayo. Suffice to say that Mrs. Mayo lives on a farm, knows the hardships and pleasures of farm life, and is wholly in sympathy with the women of the farm. She knows the needs of farmers, and through her long experience in addressing farmers' gatherings knows how to reach the sympathies of the farmers. She has been conducting a large number of Women's sections in Farmers' Institutes during the last two winters, and has always made a particularly strong impression.

TOPICS.

The general theme of Mrs. Mayo's talks will be along the line of the talk which she gave at Milford on "Mother and Daughter," discussing the most important and far-reaching question that confronts the home maker. The topic will be divided into three, and one topic will be presented each afternoon.

1. *"The House We Live In."*
2. *"Wifehood and Motherhood."*
3. *"Mother and Children."*

ATTENDANCE AND EXPENSES.

Attendance at these lectures will *cost nothing.* We shall pay all of Mrs. Mayo's expenses, except that we shall ask various localities to entertain Mrs. Mayo, and to see that she is taken from one point to the next. We want every farmer's wife and daughter in your vicinity to attend these lectures.

CLASSES.

While every woman is free to attend, and is most cordially invited to do so, we desire as a part of the plan, a class of, say ten, who will agree to attend regularly, to take notes of Mrs. Mayo's lectures, and to discuss at each meeting the points brought up at the previous meeting. Mrs. Mayo will have with her one or two

little books, costing not over twenty-five cents each, which will be used by those who can spare the time for a little reading during the week. Mrs. Mayo will ask members of the class to spare fifteen or twenty minutes a day in reading perhaps a chapter or two in one of these books, and report at the next meeting.

DATES.

We have arranged the following dates for Mrs. Mayo:

Highland—Tuesday, March 9. March 16. March 23.
Milford—Wednesday, March 10. March 17. March 24.
Wixom—Thursday, March 11. March 18. March 25.
Novi—Friday, March 12. March 19. March 26.

The meetings will be held at *two o'clock in the afternoon*, and the first meeting will be held at the places designated below. Places for subsequent meetings may be arranged later. We also give the local managers, to whom you should appply for further information.

Towns.	Local Manager.	Place of Meeting *
Highland.	Mrs. Thos. Harrison.	.....
Milford.	Mrs. Sam'l McCall.	.....
Wixom.	Mrs. J. L. Sibley.	.....
Novi.	Mrs. J. D. Hazen.	.....

* Place was written in by local managers.

AN EVENING TALK.

In addition to the above we wish to experiment with an evening meeting at two points—preferably at Milford and Wixom, for the convenience of Mrs. Mayo. At these evening meetings we wish to secure the attendance of all the young men and women of the neighborhood, to discuss with Mrs. Mayo the subject of "Winter reading on the farm." At this meeting Mrs. Mayo will read from magazines and books, and suggest to young people what to read, how to read, and when to read. She will have with her a few first-class periodicals, and will ask members of the class to read, during the week, a certain article and report at the next meeting. Mrs. Mayo is eminently a teacher, and any young people who are in the least ambitious will gain inspiration from attending these meetings. There will be nothing difficult about it, and Mrs. Mayo will be sure to make the work of interest.

AN EXPERIMENT.

As indicated in our opening paragraph, this series of lectures is wholly an experiment. If successful we shall take steps to continue them, if not we shall have to try some other way of distributing that information which we believe should be given, and shall have to attempt some other means to reach the farmers in our State. We feel that if this experiment can succeed anywhere it should succeed among the farmers of southwestern Oakland county. We hope you will do all in your power to secure an attendance, and to make the meeting a success.

KENYON L. BUTTERFIELD,
Supt. Farmers' Institutes.

Agricultural College, March, 1897.

Hon. A. C. Bird, Highland, has general charge of local arrangements for these meetings.

Unfortunately the whole three weeks proved the muddiest time of year, the last week the roads being almost impassable. Yet the attendance was fair and the interest good. In both counties the verdict of the people, as far as we can learn it, is "it is a good work, and we favor its continuance." The attendance was as follows. Mr. Morrill's second and third meetings were combined at Otsego, Martin and Moline:

	1st	2d	3d
Otsego	34	41	..
Martin	30	26	..
Shelbyville	22	36	12
Wayland	40	52	42
Moline	50	46	..

	1st	2d	3d	Evening.
Highland	22	44	41	..
Milford	77	67	50	150
Wixom	33	25	37	85-87 (2 eve.)
Novi	47	92	85	..

CO-OPERATIVE EXPERIMENTS.

The experiments outlined on page 312 of last year's Institute bulletin were carried out by numerous farmers, but no reports were made in shape for publication. The work was of some value, however, and in many cases was reported at the county Institute. We believe that there is opportunity for some good work along this line. This year, however, we are offering no experiments.

EXHIBIT AT STATE FAIR.

The prizes for exhibits by County Institute Societies at the Michigan State Fair of 1896 were not competed for, and will probably not be offered this year.

AGRICULTURAL SURVEYS.

Believing that a better knowledge of the resources of the upper peninsula, so far as agricultural prospects are concerned, would remove some of the prejudice that exists in the minds of many people against that part of the State, we asked Prof. Wheeler and Hon. Wm. Ball, two of the lecturers who attended the Institutes in the upper peninsula, to spend a day in each county visited, and so far as they could in the limited time, to observe the natural agricultural conditions. The counties visited were Marquette, Iron, Dickinson, and Menominee. Of course the work was more or less superficial. But Prof. Wheeler has studied the botany and geology of the whole region, and speaks from the scientist's

standpoint. Mr. Ball is a close observer, and a successful farmer, and speaks from that standpoint. We therefore present their reports, as being valuable contributions to the knowledge of the resources of our State. The visits were made in late September.

PROF. WHEELER'S REPORT.

Superintendent of Farmers' Institutes:

DEAR SIR—According to your directions, one day during each of the Farmers' Institutes held in September, 1896, at Marquette, Iron River, and Norway, was spent in making a preliminary examination of the soil and forest conditions in the vicinity of the places named. The following report is respectfully submitted:

The extent of the upper peninsula of Michigan from east to west is about 318 miles; width, 30 to 164 miles, forming about two-fifths of the State. The general elevation is 400 to 1,100 feet above Lake Superior. A line drawn from the city of Marquette south and west to the mouth of the Sturgeon river divides the peninsula into two unequal sections, which present very marked surface and geological contrasts. The eastern portion is underlaid with sandstones and limestones. These lie in a horizontal position, making the floor of the level country to be found from Sault Ste. Marie westward. These plains slope gradually northward from the southern borders to a watershed and thence fall rapidly to the shores of Lake Superior. This portion of the State contains many lakes and marshes, and a few fine forests of mixed pine and hardwood remain. The principal portion of the agricultural lands is to be found in this section. The western portion is in marked contrast with the eastern. Here are the iron and copper areas covered with the oldest known rocks, which have been tilted up at various angles by volcanic action, forming a rugged, broken surface, with little agricultural land except in the southwestern portion.

MARQUETTE COUNTY.

The soil in Marquette county is a mixture of the pulverized red sandstones lying along the lake shore and the drift brought from the north and eastward. South and east of the city of Marquette the soil is light and sandy. A part of Chocolay and West Branch townships was examined. The trees and shrubs along the first part of the route were those common to the light, sandy plains of northern Michigan, viz.: Three species of poplar, the American aspen, the large-toothed aspen, and the balsam poplar, named in the order of size and value; small, paper, or canoe birches, pin cherries, jack pines, white and Norway pines, hemlocks, white spruce, balsams and arbor-vitæ, with occasionally a stunted red oak and red maple.

Entering Chocolay township the land begins to improve in quality, due to the limestone rocks which underlie the soil south of the lake shore. The whole of this part of the route shows the destructive effect of lumbering operations, followed by forest fires, leaving a dreary, blackened ruin, which, however, is relieved at this season of the year by the most brilliant autumn colors of maples, poplars, birches, pin cherries, set against the greens of numerous white spruces, pines and hemlocks.

The deciduous trees in the township of West Branch became larger in size and more numerous. The pin cherries and poplars give place to large, fine sugar maples, basswoods, cherry birches, elms, and large hemlocks. Comfortable farmhouses now become more frequent, the clearings are larger and young orchards are planted generally. The soil continues to improve as we pass southward along the Chocolay river. The farms are more numerous, better buildings, better crops of spring wheat, oats, barley, peas, potatoes, and even some fields of corn are seen. The best timber is seen on Sec. 12. Here is a thrifty Swedish settlement named Yalmar. Here the party stopped for dinner at the hospitable home of Mr. Gustav H. Bahrman, who has well cleared fields and good crops. Mr. Bahrman has in operation a portable sawmill. In the neighborhood is a com-

fortable Lutheran church, and a good sized schoolhouse. Here are evidences of prosperity which compare well with many communities in lower Michigan.

IRON COUNTY.

The soil conditions in Iron county are entirely different from those in Marquette county. Here the surface is underlaid with granite, in which occurs the iron bearing series of rocks, so that the hills may be said to be literally full of iron. The soil which covers these rock masses and the multitude of hard-head boulders scattered about, is a fine sandy loam of good quality and everywhere alike in composition, which seems to show that it must have been derived from the Mississippi valley waters after glacial times. This soil is very finely divided, of a rich brown color, and is easily cultivated. A portion of four townships lying east and north of the village of Iron River was examined. The country is much broken, being traversed by a series of hills and valleys lying between Iron river and Paint river. In many places the hillsides are very stony.

On the hills is a fine growth of sugar maple, the most abundant of all the forest trees in this part of the county; next in abundance and value are the yellow and cherry birches, which attain a large size. Hemlock is frequent, as well as basswood and water elm. Ironwood is common and of large size. Rock elm is seen occasionally. White spruce and balsam are frequent. The commonest shrubs are mountain maple, the beaked hazelnut, red-berried elder, and moosewood. Red raspberries are very common. No black raspberries were seen, and few blackberries.

The soil conditions and forest growth in the part of Iron county examined show that good crops may be raised here in favorable seasons.

DICKINSON COUNTY.

The soil conditions which prevail in Marquette county are continued into southeastern Dickinson county except that the drift and gravels are mixed with a larger percentage of limestones and the forests are taller. The two tracts of land are so nearly alike in all material respects that it will be unnecessary to describe the county further, except to say that since the passing away of lumbering many good farms have been cleared and the crops on the ground indicate that business principles applied to agricultural operations will bring success here as well as in the lower peninsula.

C. F. WHEELER.

[Mr. Wheeler was unable to visit Menominee county.]

MR. BALL'S REPORT.

Superintendent of Farmers' Institutes:

DEAR SIR—Agreeable to your request that during the Institute work in the Upper Peninsula I should learn as far as possible the agricultural conditions affecting farm operations in counties where Institutes were held, the following is submitted: A day was spent in driving over portions of each county where an Institute was held; and while no great amount of territory could be traveled over in so short a time, a general idea of the country was obtained, and with the specimens of the different productions shown at the different Institutes one could form a fairly intelligent opinion of what each county is capable of producing.

It is well known that the Upper Peninsula as a whole is very rich in its mines of iron and copper, with prospects of silver and gold in quantities sufficient to warrant investments in mining them. Large quantities of valuable pine lands have furnished untold quantities of lumber, and much remains unused, while large tracts of hardwood timber remain, which when relieved of the lumber and wood values will constitute the farming lands in a great measure of that portion of the State.

MARQUETTE COUNTY.

Marquette county (the first to be reported), has over two hundred farms, containing about 8,000 acres of improved land and twice that number of unimproved land. The township of Chocolay, south and east of the city of Marquette, contains the larger number of improved farms and is considered among the best for farming purposes. The land for farming purposes is somewhat scattered, or in other words is not in continuous large quantities. On hardwood ridges the land is as a rule fertile. The soil is not deep but in its new state is quite productive. Potatoes and grass are the main productions. Dairying to a limited extent is being carried on and in my judgment should be made one of the chief adjuncts in agricultural progression in that locality. The potato acreage in 1894 in the county was about 600 acres with a yield of about 7,000 bushels; and the acreage is still increasing. One farmer two miles from Marquette City has this year ('96) 70 acres of this crop which appeared very promising.

From three to five thousand acres of hay are cut yearly, yielding from 3,000 to 5,000 tons. Fine specimens of apples and plums were shown, while small fruits are grown in abundance. Nearly all kinds of vegetables are now grown and specimens exhibited were a credit to any locality. In this county large tracts of the best agricultural lands are owned by railroad companies, and are held too high in price considering the low price of farm products and the amount of hard work necessary before such lands can be put in good farm shape. Unlike the lower peninsula the wood upon such lands is not very valuable at present and in clearing has to be wasted in a large degree. Although as far north as latitude 47 and 48°, when the county is more generally cleared up and the low places drained, late frosts in the spring and early frosts in the fall will probably be less frequent and the county become better adapted to the growth of a greater variety of agricultural products. To a sturdy and determined class of young farmers without much means and who are willing to undergo privations and some hardships incident to a new country, this part of the State offers a variety of inducements.

IRON COUNTY.

Iron county, the next in order, has between one and two hundred farms, containing about 4,000 acres of improved, and 17,000 acres of unimproved farm lands. The township of Iron River contains the larger number of farms, Stambaugh, adjoining, being next in number, Mastadon following next in order. This county, like some other counties, has suffered on account of what is known as the homesteaders' trouble, on account of insecure titles to these lands. The matter is being adjusted, and it is hoped that in the near future these troubles will have disappeared and a marked hindrance to the improvement of the county annihilated. This county, as its name indicates, is full of valuable iron lands or mines. Vast amounts of wealth lie buried in its hills and only await the good time which everyone is hoping for to bring forth from its hidden sources large quantities of this wealth. The best farm lands are those situated on the large tracts of elevated hard wood lands. They are rich in fertility, with limestone in profusion, which if lime was required as an article of merchandise would be a very valuable acquisition. The township of Iron River is largely peopled with Swedes, who are an industrious, hard working people and who will in the course of a few years have their farms in fine shape and also profitable as money-makers. The principal crops are potatoes, hay, and oats, though wheat is being grown to a limited extent. In 1894, one hundred and ninety acres of potatoes were planted and about 20,000 bushels of potatoes harvested, and the quantity planted and the amount harvested in 1895 and 1896 far exceeded the above quantities, both in acreage and yield. Over 2,000 tons of hay were cut in 1894, and over 4,000 bushels of oats harvested, and in 1895 very much larger quantities of both crops were secured. In 1895 oats yielded frequently 60 bushels per acre. In 1896 the straw was heavy but the yield and quality not so good. Wheat is being grown in limited quantities but this locality bids fair to become quite a wheat growing region, especially of spring varieties. Fruits and vegetables grow well, apples predominating in the fruit line. The same remarks as to people and farming made

with reference to Marquette county will apply to Iron county, and I think the prospects for the farmer better on account of a superior soil and fully as mild a climate.

DICKINSON COUNTY

is a new county, full of iron ore and with plenty of mines, some at work and some idle. The general character of the surface is somewhat similar to Iron county, but good farming lands not so plenty, with more of the poorer sorts. The township of Norway contains most of the lands used for farming purposes. Dickinson county in 1895 reported 55 farms containing 2,251 acres of improved lands and 3,805 of unimproved land, of which amount the township of Norway claimed 1,287 acres of improved and 1,623 unimproved acres. Number of farms twenty. This number is increasing slowly. As a whole the land is not so fertile as in Iron county. There is less hardwood land and more of lightish sandy land. Though some wheat, corn, oats, and hay are grown in this county, the main crop is the potato crop, 31,000 bushels having been raised in 1894 with an increased amount in 1895. On some of the lighter lands of this county is located a farm of several hundred acres and finer crops of mangels, fodder corn, and hay need not be expected from the more fertile farms located elsewhere. These crops were produced by a systematic method in farming. Plenty of stock is kept and large quantities of manure made and properly applied, all going to prove that superior cultivation even upon poorer land brings with it a proper reward.

One thing noticeable in all the counties mentioned is a lack of sheep. As soon as suitable houses for winter shelter can be secured I believe that there is nothing that will tend to make farming in these localities pay so well as a proper number of good sheep. Add to this the dairy, which in both Iron and Dickinson counties should be increased. I saw some as good corn grown in the vicinity of Norway (fully matured) as need be seen in any county. Variety, what is known as flint corn. Wheat is grown quite successfully upon a few farms and probably may be on many more. Fruit and vegetables grow well. Among the many iron localities are found many acres of fair farming lands which should be cultivated and if the mines resume active work, as people believe they will, a home market and a good one will be found at the farmer's door. Land is cheap. The climate healthy, water pure, schools and churches abound, and while there are some drawbacks, there is much to encourage thrift and industry as applied to farming in Dickinson county.

MENOMINEE COUNTY

is situated further south than any of the counties enumerated and is from its location better adapted to agricultural purposes. This county has been noted for its lumber interests in the past, but as its forests of pine disappear farming operations increase and upon the whole men who have been engaged in lumbering are becoming convinced that the permanent wealth of the county lies in its agricultural capabilities. The surface of the portion over which I traveled, a distance of forty miles from north to south, was mostly level and soil for farm purposes mostly good. This was attested by the crops grown. The land reported as now in farms in 1895 was in round numbers about 53,000 acres. Of this number of acres about 20,000 are improved; number of farms about 600, and this number is increasing, judging from the new clearings and new buildings as seen along the highways. The township of Stephenson leads all the townships in the number of farms, amounting to nearly one-fourth of the whole. In this county are grown wheat, corn, oats, potatoes and hay; potatoes leading with an amount in 1894 of 88,634 bushels from 881 acres.

In the year 1894 there were raised 30,000 bushels of wheat from 2,191 acres, average yield 13.56 bushels per acre. Some corn was raised amounting to 1,121 bushels and 97,144 bushels of oats. Hay in 1894 amounted to over 8,000 tons. Fruit is generally grown, especially apples. Dairying in some parts of the county is carried on to a large extent, particularly at or near Menominee city. There are large amounts of farming lands for sale at reasonable prices in this county, lands which will become more valuable as farming takes the place of lumbering. The township of Stephenson takes the lead today in agricultural pursuits. The farmers are a wide-awake and intelligent set of men and women. At the last Institute held there

a very fine display of horses for farm work was made. Some very good cattle and swine, but strange as it may appear very few sheep. The fruit and vegetable display was very fine and full. The work of the different schools showed thoroughness and interest on the part of the teachers and pupils and spoke well for the general interest in all that goes to make a community prosperous and intelligent. The farmers in this part of the State think they are entitled to an experiment station and I think their ideas are sound. Many of the experiments made at the stations further south do not apply with particular force to those localities further north, and they think that the State Board of Agriculture should locate a station in that vicinity even at the expense of abandoning one in the south part of the State. I hope their prayer when presented will be granted.

As seen by the hurried visit in the counties mentioned as well as by the study of the reports made from these localities, I am convinced that a prosperous future is in store for those farmers who will make the most of the opportunities at their command. No country in the world has the double or quadruple advantages in its ores as the Upper Peninsula of Michigan. Iron and copper, gold and silver will be stable commodities as long as people live. The mines so long idle will in the course of a short time be in full operation. Miners will have to be fed. A home market, the best in the world, awaits the farmer here. One of the essential needs in these localities is more stock of the proper sorts if they receive the care and attention that that stock requires in any locality.

Yours truly,

WILLIAM BALL.

REPORTS FROM EACH INSTITUTE.

CONDUCTORS' REPORTS.

Of each conductor of an Institute we asked a brief report, in about the following words: "We should like from you a report of the Institute for publication in our next annual Institute bulletin, giving an idea of the meeting, its successes and failures, strong and weak points, criticisms, favorable and unfavorable, of local management, etc." The following are the reports:

ALCONA COUNTY—HARRISVILLE: Local conditions conspired against this Institute, causing small attendance, but there were several very bright men in attendance who took active interest. For a sparsely settled county, little fault can be found with the Institute, taking into consideration the state of the roads and weather, and an unfortunate murder that occurred in town during the second session.

ROLAND MORRILL, Conductor.

ALLEGAN COUNTY—ALLEGAN: Allegan county is in the habit of having good Institutes and the one held this year at its flourishing county seat was no exception. An important feature of this Institute was an anniversary session, held Monday evening, January 11, to commemorate the inauguration of the Institute idea just twenty-one years previously. At that date the first Farmers' Institutes in this State, as we now know them, were held simultaneously at Allegan and at Armada. Dr. R. C. Kedzie, who conducted the original Institute at Allegan, was present at this anniversary meeting and read a paper on "The Starting of the Institute," which will be found published on another page of this report. Several others present at that meeting were also present at this one and made brief speeches. Gen. D. B. Pritchard, who presided over the former meeting, was present and presided over this one and made a felicitous speech. The *Allegan Gazette*, of January 16, gave a full report of this and other features of the Institute this year.

The topics of most general interest appeared to be fruit growing and dairying. An interesting discussion occurred on the comparative profit of fruit raising near the lake shore and in the interior of the county, in which it was made manifest that the lake shore had much the advantage, particularly in the way of transportation. There was a fine exhibit of apples at the meeting, made by Wm. B. Andrus of Allegan. Also an excellent show of potatoes grown by Mr. R. L. Vahue of the same place from seed obtained at the Agricultural College.

A. A. CROZIER, Conductor.

ALPENA COUNTY—ALPENA: The Institute here was a decided improvement over the one held the year before. Although the attendance was not large, owing to the sparsely settled character of the country surrounding Alpena, the interest

was all that could be asked. Several prominent business men of Alpena took an active interest in the Institute, among them being E. O. Avery, who was reëlected president of the county Institute society and who is an excellent presiding officer. Mr. Avery has several farms in the county and one of the finest silos in northern Michigan.

Fruit growing is a prominent industry in this region, especially the raising of plums. The cultivation of Indian corn is on the increase, particularly at points somewhat remote from the lake. Alpena is an enterprising city with numerous important and varied manufacturing industries. Lumbering is on the decline, but is being sustained at present by large importations of logs from Canada. The surrounding country contains much good land for farming purposes which may now be had at a very low figure.

A. A. CROZIER, Conductor.

ANTRIM COUNTY—MANCELONA: The Institute held in Mancelona may be considered a success. The attendance was fair from the beginning and increased as the sessions followed each other. The topics treated upon were mainly well handled and seemed to be appreciated by those in attendance. Institute work in this portion of the State is in its early development, but is being appreciated. At this Institute there was a good attendance considering the rough weather and from the fact that while sleighs were running around and near Mancelona, wagons had to be used in other portions of the county, and as a consequence many were kept away who had intended to be present. Would suggest that the local workers see to it that those on the program are more prompt to perform the duties assigned them.

WILLIAM BALL, Conductor.

ARENAC COUNTY—STANDISH: The Arenac County Institute was so great an improvement over its predecessor, the meeting of 1896, that it must be called a success. Compared also with larger and more thickly settled counties it also stands well. The success this year is doubtless due to some extent to the good seed sown at previous meetings, but very largely to the personal efforts of the efficient secretary, Mr. A. H. Welles, and the president, Hon. Peter Gilbert. There was a lack of discussion of subjects, due perhaps not so much to indifference on the part of those present as to diffidence. The local papers were good. The management of the Institute was good, both president and secretary doing their particular work well.

A picnic dinner on the last day added somewhat to the interest, and without taking anything from the Institute, was a social feature that was a benefit. I think there will be no trouble in having large attendance at future Institutes in this county.

I. H. BUTTERFIELD, Conductor.

BARRY COUNTY—HASTINGS: The sole unfortunate feature of this Institute was the exceedingly small attendance. The interest elicited was good but the attendance was small. The somewhat recent unfortunate failure of a costly creamery in the immediate vicinity partly accounted for the depressed condition of the dairy business in that part of the county.

The Institute society had held few if any meetings during the past year and little enthusiasm in matters relating to the work had been aroused. There was need of good active hustling on the part of the township vice-presidents and members of the society. It is better also to have part of the regular papers read by local men; the discussions are sure to be livelier and more valuable. Moreover the attendance is sure to be better.

C. D. SMITH, Conductor.

BAY COUNTY—AUBURN: Auburn is a small station eleven miles west of Bay City. The country is level and rich. The attendance was not large, but the reason no doubt can be charged to its not being well advertised. I was informed that it was imposible to get the committee together to do business, and the success of the Institute was largely due to Mr. John C. Rowden, a local merchant. Owing to the absence of the president, Mr. Oviatt presided. He made a good presiding officer, and kept up an interest.

The papers were good, as was the discussion. One paper I will have to make mention of, which I think should have been couched in little better language. We should all be careful to choose such language as will not cause a blush on the face of the most refined lady. The paper was good, but conveyed the ideas in little too strong language. However, the Institute was a success and everybody seemed pleased. Meals were served overhead which made considerable noise.

I. N. COWDREY, Conductor.

BENZIE COUNTY—BENZONIA: While the attendance was not as great as when the Institute was held in Frankfort last year, the interest was remarkable from beginning to the end. Fruit was practically the only subject under consideration the first day. Mr. Stearns was questioned and cross-questioned from morning till night, and was brought in just before train time the following morning to give testimony on pears for market.

Notwithstanding the poor market for all kinds of fruits, Benzie county fruit growers have faith in the future prospects, and judging from the displays of fruit made the region is peculiarly a fruit country. Home dairying will be developed soon to a larger extent, as many ladies are alive to the fact that the country is well adapted to dairying, and that the fruit and dairy interests work well together. Excellent music was furnished by talent directed by Prof. Glasson of Benzonia College.

F. S. KEDZIE, Conductor.

BERRIEN COUNTY—NILES: The weather during this Institute was very cold and at times stormy and blustering. Notwithstanding this fact the attendance after the first session was good and for the afternoon and evening session very large. The interest throughout was most excellent. Questions relating to potato growing received thorough discussion on the part of the audience, as did also the matters in relation to the dairy and stock raising generally. The farmers present ably discussed the advanced methods of caring for stock and by their questions indicated a keen interest in progress along this line.

The women's section was well attended and awakened a good deal of enthusiasm.

The Institute was fortunate in having live, progressive and level headed officers to whose efforts much of the success of the Institute was due.

C. D. SMITH, Conductor.

BRANCH COUNTY—COLDWATER: The Institute in this county was held in the Presbyterian church in Coldwater and proved a success from start to finish. The local assistance was excellent and able, the discussions free, interesting and valuable. Music excellent.

The officers were efficient and courteous. The attendance was large, 700 people being in attendance at two sessions.

The farmers in Branch county appreciate the benefits of organizations and the Farmers' Institute has a place in the front rank.

WILLIAM BALL, Conductor.

CALHOUN COUNTY—ALBION: No adverse criticism. These people have been holding Institutes until they know their value and they make the most of them.

ROLAND MORRILL, Conductor.

CASS COUNTY—CASSOPOLIS: This was a fairly successful meeting, nothing but favorable comment being heard, and all entered into the spirit of the meeting with considerable interest.

ROLAND MORRILL, Conductor.

CHARLEVOIX COUNTY—EAST JORDAN. The Institute held in East Jordan may safely be classed among the best. The local managers were thorough workers, understood their business, and proved themselves capable of performing the duties of their positions, a fact emphasized by a second election. It may be truthfully said that it was a success. The criticism, if any, is that those preparing the program should insist that those who accept a place on the program shall perform the duties they agreed to perform. It is to be hoped that the officers for the ensuing year will make an effort to secure at the next Institute an attendance that will crowd the capacity of all the space secured.

The necessary expense for running the Institute was not only secured, but the books show a balance of $25 or more on hand for useful purposes another year. The membership for this county is large, due in a great degree to the activity of the president and secretary, in connection with the interest shown by the vice-presidents in securing funds by getting members. I look for a rousing Institute another year.

WILLIAM BALL, Conductor.

CHEBOYGAN COUNTY—CHEBOYGAN: A most interesting time; all took hold and discussed the subjects. Farmers find a ready sale for their produce. We were entertained in right royal style. We were very much interested in the local papers. Cheboygan is a delightful town any time of the year. Institute should be held earlier in the season.

E. A. CROMAN, Conductor.

CHIPPEWA COUNTY—SAULT STE. MARIE: The "Soo," as the county seat of Chippewa county is called, surprised all of the Institute workers from the south. It would have been out of place to speak of raising Indian corn, melons, tomatoes, and sweet potatoes, but in all of my experience of Farmers' Institutes for the past twenty years, I never have met a more attentive and eager gathering of farmers when the subject of grasses and clovers was under consideration. Questions came thick and fast, and the discussion was first class on these topics for fully two hours. They were delighted with the exhibit of forage plants which were hung on the walls. They had already tested an unusually large number of grasses, when compared with any community I have visited in the State. They raise to perfection grasses, clovers, peas, oats, wheat, bagas, potatoes, ice and numerous kinds of fish. Weeds are not very troublesome on the new farms near the "Soo." By request I visited the high school and spoke twenty minutes on learning to observe, the best way to begin botany, and the like. Farmers have a first-class home market and I heard no complaint of hard times. On the average, 77 vessels go through the locks each day of the year, while navigation lasts, thus here is a market for berries, vegetables, milk, butter, chickens, eggs, meat and flowers.

W. J. BEAL, Conductor.

CLINTON COUNTY—ST. JOHNS: This Institute had a very light attendance, but a very intelligent audience. There appears to be an undercurrent of dissatisfaction locally here, owing in my opinion to the competition of different villages for the place of holding meeting. Also the action of the lawyers of St. Johns in refusing the use of the court house for day sessions, after it had been advertised, had a bad effect. Would advise that next Institute be held elsewhere.

ROLAND MORRILL, Conductor.

CRAWFORD COUNTY—GRAYLING: With six sessions people hang off on the first one or more. At most of the sessions the superintendent of schools was glad to send three to six to make a report to his school.

In meeting farmers previous to the meeting, the reply given to the secretary by one man was, "I am not going to attend; I know mor'n the hull of them fellers." The secretary said, "Then stay right where you are."

These are the topics given for a good program next year, when asked: Fall plowing, deep or shallow plowing, level or hill culture, markets, roads, composting manure, farm horses. They want a session for women. Some speakers had good words for the pioneers who made homes on the stump lands, and the reverse for those who "skin" the timber and leave desolation.

W. J. BEAL, Conductor.

DICKINSON COUNTY—NORWAY: Indifference, except by a few, was a marked feature in the Institute held in Norway. The secretary had made a thorough canvass of the county, hoping to create an interest in the Institute, but his efforts were not crowned with marked success. Too few farmers attended the sessions and these seemed to have more important business on hand than was manifested in Institute work. An earnest effort will be made by the officials to secure greater interest among farmers, should another Institute be held there.

WILLIAM BALL, Conductor.

EATON COUNTY—CHARLOTTE: Not all the conditions were favorable for a large Institute at this place and time, the weather being bad and the only available hall much less convenient and attractive than the court house, where the Institutes have usually been held. Nevertheless a good audience was present at each session and the frequent discussions and steady interest showed full appreciation of the excellent program. The local management was good in all respects, and the Institute as a whole highly creditable to all concerned. A strong impression doubtless was carried away by most that Eaton county would always insure a first class Institute.

WALTER B. BARROWS, Conductor.

EMMET COUNTY—HARBOR SPRINGS: For the first time since Institutes were held in northern Michigan the weather for the Institute was free from blizzard symptoms. The court room was fairly well occupied when the Institute opened Wednesday morning, and the numbers in attendance increased from session to session. The farmers present were all of the progressive kind and filled the sessions full with discussion. Samples of three varieties of corn and some root crops were exhibited. Here as at Kalkaska the large potato crop and the prospective market for it were topics for much careful consideration. The idea was expressed that too many business and professional men keep a private potato patch, or even raised them to sell.

F. S. KEDZIE, Conductor.

GENESEE COUNTY—FLUSHING: The institute was well attended and much interest was manifested. The secretary, Mr. James A. Button, had worked up a good deal of enthusiasm in the community. Visitors were well cared for, and everything was done by the citizens of Flushing to make the Institute a success. The local part of the program was well carried out by able speakers. An attempt was made by a few to get an expression against future appropriations, but the attempt was a failure, as only a very few voted in that direction. A resolution requesting the legislature to continue the appropriation of $10,000 for the next two years was passed with but few dissenting votes. Genesee county in the past has held many successful Farmers' Institutes and the last one was no less so.

WILLIAM BALL, Conductor.

GLADWIN COUNTY—GLADWIN: Gladwin is a new county, the county seat containing 900 to 1,200 people. As a rule the people are not now gushing over with enthusiasm in regard to farming. Most of their time has been spent, with rare exceptions, in cutting and selling timber. It is extremely difficult to know just what you can do that shall please and benefit people of this class. The most hopeful sign, it seems to me, is to look out sharply, for the lads and lasses coming on. There was at all our sessions a good proportion of these young persons. From the high school, there was a delegation of two to four, who came with books and pencils to take notes for a report. As the attendance was small at first, I took especial pains to tell them some plain facts about corn smut and black rot of tomato. I showed them our grasses, and in each case told them what notes to make. This part of the work at the same time seemed to interest the older people. Later, the school superintendent told me most of the delegates were children of farmers, that one report today was twelve minutes long and all were good.

W. J. BEAL, Conductor.

GRAND TRAVERSE COUNTY—TRAVERSE CITY: Friday and Saturday, December 4 and 5, were the dates during which the first Farmers' Institute under the new law was held in Grand Traverse. Long ago when the Institutes were first inaugurated by the Board of Agriculture one of the first was held here. Since then the grange has continued the work and has developed a number of the most energetic and thoughtful Institute workers to be found in Michigan. One of the factors working against a large attendance was that in former years the Institutes had been held in January and many farmers felt that the dates set were too early for their convenience. Notwithstanding this, however, the attendance of farmers was good at all sessions, distant parts of the county being represented at every session.

Some changes of program were necessitated from the non-arrival of the State workers, delayed on account of the few trains daily on the railroads of northern Michigan. The Institute as a whole was interesting from first to last, the audience appreciative, the discussions lively. A larger representation of the young men and women from the farm homes at these meetings would add vastly to their value and interest. Another year steps looking in this direction will be taken by those having the Institute in charge.

The work of the program committee and officers of the Institute society was perfect in every detail. Very naturally the society passed resolutions of commendation (to be found in the secretary's report) and reëlected the officers who had served them so well.

F. S. KEDZIE, Conductor.

GRATIOT COUNTY—ST. LOUIS: "Round-up."

HILLSDALE COUNTY—HILLSDALE: The local merchants and press had taken much interest in the success of the Institute and through the efficient secretary had been widely advertised by neat programs and posters, but the intense cold and snow storms prevented the people from turning out, the thermometer averaging below zero throughout the session. The papers presented by local talent were good and thoroughly discussed and a high degree of interest manifested throughout.

R. M. KELLOGG, Conductor.

HURON COUNTY—BAD AXE: This county seems to be a very fertile one, the leading industry being stock and grain growing. The Institute was a good one in general. Local officers and speakers did well, and organized a strong society for the next year.

ROLAND MORRILL, Conductor.

INGHAM COUNTY—STOCKBRIDGE: The sudden drop of the temperature and rough condition of the roads made the first session on Monday very late beginning and the attendance small. There was no lack of interest due to this cause, however. Of the Monday evening session Mrs. Mayo said in substance, it was the best meeting she had attended in twenty years. The "tone" of the papers and discussions was of the highest. A noticeable feature of the Institute was the hospitality of the people and the neatness and excellence of the dinners served in the basement of the town hall. The marked shortage in the supply of programs will doubtless not occur another year. They had been distributed before the meeting as advertisements and were not brought in by those receiving them.

H. E. VAN NORMAN, Conductor.

IONIA COUNTY—IONIA: This was a three days' Institute and was a "Round-up" of a series of one day Institutes held in different parts of the county the previous week. The attendance was small during the forepart of the Institute, but increased in numbers and interest as the Institute progressed. Some seemed to think that the small attendance was due to the one day Institutes, but I think it more likely on account of the extremely cold weather at that time. The hall was good, but could not be kept warm. The local papers were excellent, and good music and recitations took appropriate places on the program. The very best feeling existed throughout the meeting. The city folks took an active part in the meetings, which shows that they think there is something in farming besides hay-seeds. This good feeling you find everywhere. The meeting was a success. Ionia county has wide-awake farmers who can tell what they know. The papers and talks by local speakers were excellent. Too much praise cannot be given the president and secretary.

I. N. COWDREY, Conductor.

IOSCO COUNTY—TAWAS CITY: Considering the small portion of this county devoted to agriculture, and the large foreign population, this meeting was a decided success. The officers did their duty well before and at the meeting, local speakers and audience being active and interested. I cannot criticise any part of their work.

ROLAND MORRILL, Conductor.

IRON COUNTY—IRON RIVER: The Institute at Iron River was a success. The attendance was good and much interest was manifested by those attending. Quite a large number of farmers attended the sessions and all seemed anxious to take advantage of all benefits afforded. The citizens of Iron River are awake to the interests of the farmers, knowing that their success in a measure (even in this mining county) is dependent upon the success attained by farmers.

WILLIAM BALL, Conductor.

ISABELLA COUNTY—MT. PLEASANT: This Institute was held in the court house at Mt. Pleasant. The attendance was large throughout and at several of the sessions the people who came could not be properly accommodated in the court room. This is the second year that the State Institute has been held here and the increased attendance was very gratifying. The county is well organized with farmers' clubs, to which fact the good attendance was evidently in a great measure due. The attendance of ladies and young people was especially good at this Institute and the program was enlivened by music and recitations. The Institute covered three days, a local program being provided for the first day. School topics largely occupied the time the first day and in the evenings. The county has been settled longer than most of the other counties in the same latitude, and the farmers are generally intelligent and prosperous. The soil is good, much of it a light sandy loam well adapted to growing potatoes. The original timber was mixed hardwood and pine. Stock raising is an important industry here at present, many fat cattle being shipped from the county to eastern markets.

A. A. CROZIER, Conductor.

JACKSON COUNTY—BROOKLYN: This Institute had been well planned and cared for by competent men and it proved a great success.

ROLAND MORRILL, Conductor.

KALKASKA COUNTY—KALKASKA: The Institute opened Monday, November 30. During the week previous the weather had been very stormy, warm rainy days, but towards Saturday night the temperature fell rapidly and both days of the Institute the air was very cold and the roads rough. This kept many from the more distant parts of the county from attending, although portions as far as fifteen miles were represented. The audience, although not as large as last year, was gratifyingly prompt with questions and full of interest in the work of bettering the farming carried on in Kalkaska county. The farmers of the locality may be characterized by the remark that they are wide awake and anxious to progress.

F. S. KEDZIE, Conductor.

KENT COUNTY—GRAND RAPIDS: This meeting was a success in every particular. The farmers of Kent county are among the brightest and most enterprising in the State, and while I have attended a great many meetings here I never yet saw a poor one.

ROLAND MORRILL, Conductor.

LAKE COUNTY—CHASE: This Institute was a decided success from the beginning to the end. As a whole this county is very largely pine plains, interspersed with strips of very fair quality of agricultural lands. The attendance indicated a more general interest in Institute work than in many other counties more favorably situated. The interest centered in the dairy and sheep husbandry. It seemed to be a consensus of opinion that more stock of some kind must be kept upon their farms, and especially such stock as could be kept upon the plains a portion of the year.

Much credit is due the local management for the persistent advertisement of the Institute previous to the meeting, and the increased number in attendance was a practical endorsement of the value of printer's ink. One of the commendable features of this Institute was the large attendance of young people, the high degree of intelligence displayed by the local papers, the anxiety of all to learn as much as possible from the practical experiences of their own people. There was at all the sessions an enthusiasm which did not fail to reach even the State workers with good results.

A. E. PALMER, Conductor.

LAPEER COUNTY—LAPEER: The Lapeer Institute was largely attended by substantial farmers. The local papers were good and the discussions were lively and interesting. The officers were on hand and did their work well. The women's section was highly spoken of and a desire expressed for its continuance. I have very little criticism regarding this Institute. I heard some criticism locally in regard to advertising, but the attendance was all that could be accommodated and I think those who criticised could not have read the papers. The *Clarion* gave a very full and complete report of the Institute.

I. H. BUTTERFIELD, Conductor.

LENAWEE COUNTY—ADRIAN: The Institute was held in the court room. The sessions were fairly well attended. The interest moderate. A number of the local workers failed to put in an appearance. No music furnished. No particular attention was given to the time in commencing the sessions as far as the time announced in the program was concerned. Presiding officer competent and courteous. The press of the city did full duty both in attendance and in reporting.

WILLIAM BALL, Conductor.

LIVINGSTON COUNTY—HOWELL: The Institute at this place offered a strong contrast to most of those attended during the winter, and serves as a good example of the harm which may be done by a very few ill-disposed persons, in spite of the general good feeling of the county. The Institute was well attended, the same State speakers were present as elsewhere, and there was a fair proportion of excellent local talent; yet from beginning to end there was a spirit of criticism and dissatisfaction, fostered by a few and tolerated by more, which seriously interfered with the work of the meeting, and detracted materially from its beneficial results. It was evident that a certain faction had long ago passed the period when others could give them any information, and they blamed the State for making the attempt in that locality. Probably less than a dozen malcontents of this stamp were responsible for most of the unpleasantness which made so much of the meeting exceedingly uncomfortable to a majority of the audience as well as to the local officers. The fact that some of these "kickers" were not even residents of the county, much less members of the Institute society, made the matter all the more unfortunate.

In spite of the unfavorable conditions, however, the Institute as a whole was a decided success, and cannot fail to be productive of good.

WALTER B. BARROWS, Conductor

MACOMB COUNTY—ARMADA: The Institute evidently had been well advertised and was fully attended; it came very near the ideal farmers' Institute. Everyone there seemed to have come for the purpose of getting something valuable from the meetings, and so far as I could learn none went away disappointed. The papers were of a high average and the local speakers were unusually strong. The discussions were, in the main, full and satisfactory, the only exceptions resulting from lack of time. Not a single element of unpleasantness or discord was introduced, and the management has a right to congratulate itself on a thoroughly enjoyable and in every way satisfactory meeting.

WALTER B. BARROWS, Conductor.

MANISTEE COUNTY—COPEMISH: The Institute held in Copemish must be considered among the best held in this part of the State. The attendance was large for the county, the average attendance being 196 per session. The local part of the program was well carried out. The citizens of the town opened their houses for the entertainment of farmers from a distance, which added materially to the success of the Institute. The music furnished added to the interest of the occasion. The comfortable church furnished was conducive to comfort and good order. The interest in agriculture increases as the timber product decreases, which is an indication of progress.

WILLIAM BALL, Conductor.

MARQUETTE COUNTY—MARQUETTE: The attendance at this Institute was small, whether the attendance from the city or from the county or both are taken into consideration. It can hardly be called a success; very few farmers attended. No

great interest except by a few was manifested. The local management tried to do well, but was handicapped by a lack of attendance and interest on the part of farmers and business men. Should another Institute be held in Marquette county I would suggest that some other point than Marquette be selected.

WILLIAM BALL, Conductor.

MASON COUNTY—SCOTTVILLE: Scottville is surrounded by excellent land, especially adapted to general farming and stock raising. While the attendance was not large, the audience was deeply interested in the topics discussed. A large delegation was present from Ludington and vicinity, where the fruit interests predominate. The subjects of greatest interest to the people of Scottville were grasses, forage crops, stock raising and feeding.

H. P. GLADDEN, Conductor.

MECOSTA COUNTY—MORLEY: The Institute was held at Morley, a small town on the G. R. & I. railroad in the southwestern part of the county. Farming here is comparatively new. The potato crop is an important one here but has brought a very low price for the past two years so that many of the farmers are having a hard time to get along. Land is cheap and generally of good quality, but the cost of pulling the numerous large pine stumps makes it expensive to clear. These stumps are used for building fences and serve well for that purpose. Many farmers here are endeavoring to learn whether or not the county is adapted to fruit raising. There appears to be no grange or farmers' club in the county at present. The secretary of the Institute society was kept at home by sickness in the family, but the meeting had been well advertised and there was a fair attendance. A number of prominent farmers were down from Big Rapids and vicinity and it was voted to hold the next meeting at that place.

A. A. CROZIER, Conductor.

MENOMINEE COUNTY—STEPHENSON: The Institute held in Stephenson, like its predecessors, was a grand success. Every session was well attended by both farmers and townspeople. The officers were capable and were alive to the interests of the whole community. An exhibit of stock of all kinds, grains, fruits and vegetables, was a marked feature of this Institute. Excellent specimens of school work were exhibited, which gave evidence of the ability of those in charge of the different schools competing as well as the ability of the pupils whose work was shown. The display of women's work, of many descriptions, was excellent. The people of Stephenson are to be congratulated upon the success attending their third Institute.

WILLIAM BALL, Conductor.

MIDLAND COUNTY—MIDLAND: The Institute at Midland was a success. The attendance was not large, but this was no fault of the officers and members of the Institute society. While the attendance was not large the people were enthusiastic and interested.

The papers and talks given by local speakers were well prepared and presented by men thoroughly acquainted with their subjects, consequently this feature added much to the interest and real value of the Institute.

Local arrangements and details as well as the comfort and pleasure of the visiting speakers were carefully looked after. We believe the Midland Institute society is in good working order and with every prospect of a healthy growth in the near future.

H. W. MUMFORD, Conductor.

MISSAUKEE COUNTY—LAKE CITY: The Institute at Lake City was not as well attended as it should have been. The weather was all that could be desired, but farmers did not as a rule seem to realize what good might be brought out in the discussions incident to an Institute. If a few farmers' clubs could be formed in different parts of the county more interest in Institute work would undoubtedly follow. I hope and believe that the next Institute held in this county will be a marked success. The secretary is urged to wake up an interest among farmers in this vicinity. Confer with the vice presidents and president and see that all are inter-

ested and much good will be done. A great deal depends upon thorough work. More young men and young women from the farm should attend, also more of the older women upon the farms.

WILLIAM BALL, Conductor.

MONROE COUNTY—MONROE: This Institute was held in the court house, and lasted three days. The attendance was not large on account of cold weather. The hall was fine and very comfortable although very cold outside. The attendance increased as the Institute proceeded. Considerable interest was taken in fruit and the beet sugar industry. Resolutions were adopted to inquire into the practicability of starting a beet sugar factory.

This county is wide-awake in Institute work, there being an independent Institute held just previous in London. The county is well supplied with farmers' clubs, which makes it possible to hold an Institute at any cross roads. Excellent papers were presented by local talent, and good discussions followed. Everybody seemed to be pleased with the work done, and felt that it was good for them to be there. This Institute was fortunate in having good officers, and a careful secretary. The hotelkeeper is a farmer and told how he sold his potatoes for eight dollars a bushel, boiled.

I. N. COWDREY, Conductor.

MONTCALM COUNTY—CARSON CITY: An excellent Institute throughout—good attendance, good papers, good interest. Accommodations and management were good in every particular. I think the farmers of Montcalm appreciate the work being done and can be depended on for a good Institute at any point they may select.

ROLAND MORRILL, Conductor.

MUSKEGON COUNTY—MUSKEGON: This Institute was a success when we come to consider that the country immediately adjoining Muskegon is not a good farming region, the best part of it being the northern and eastern portions.

ROLAND MORRILL, Conductor.

NEWAYGO COUNTY—FREMONT: One of the best Institutes of the year was held at Fremont in this county. Fremont is a thriving village located in the midst of an excellent farming district which is now being rapidly developed. Fruit growing and dairying are perhaps the leading branches of agriculture here. The exhibit of apples at the Institute was exceptionally fine, the fruit being unusually well preserved and free from blemishes. Peach growing is in its infancy, but several residents of the county harvested large crops the past season and many thousand trees are being set each year. This was the second annual Institute held at this place, which, it was said, accounted for the large attendance. Much credit, however, must be given to the local grange for the sentiment it has created in favor of meetings of this kind and for the direct help of its members in the conduct of the Institute.

The meetings were held in the Congregational church, which contained the largest audience room in the village, but which was not sufficient to hold all who came to the closing session. All the topics on the program were well received, the address by Roland Morrill, on "Business Methods in Farming," being especially well liked. Mr. Fulton's talk on fences was evidently just what was needed as several in the audience had recently been defrauded in the purchase of so-called patent fences and fencing rights. From the discussion it was evident that information on the best and cheapest methods of fencing was much in demand. Owing to a strong desire on the part of members from other parts of the county, it was voted to recommend that the next Institute be held at Ashland, unless, as it was hoped, the "Round-Up" for 1898 could be secured for Fremont.

A. A. CROZIER, Conductor.

OAKLAND COUNTY—MILFORD: The Institute was well attended. The local papers were good but at some sessions there was too much on the program, especially of music and recitations. Local managements should be cautioned against filling up time with such exercises. They should be used only as spice and resting places in more serious work. The officers of this Institute did their work well.

The subjects of most interest were fruit growing, general farm crops and stock growing. Sanitation also received attention. The women's section seemed to take well. Some of the State workers talked too long, leaving not enough time for discussion.

I. H. BUTTERFIELD, Conductor.

OCEANA COUNTY—SHELBY: The long fruit Institute was a success in numbers, interest and especially in expression of its effect by those who attended. The attendance was very constant. There was no lagging in interest from its opening to the adjournment and my impression is that one hundred people attended every session but the first one. I mean by this one hundred were in constant attendance while its average was about one hundred and ninety. There was nothing lacking in its day meetings. Every speaker came on promptly. The questions and discussions were confined closely to the topics in hand. The lecturers were clear, concise, and apt in their methods. The illustrations were well calculated to interest and instruct. There was not a tiresome thing about a single exercise. The exhibit was very fine under the management of Mr. Woodward and Mrs. McClure. The janitors and ushers were attentive. The hall commodious, neat, well ventilated, and had admirable acoustic qualities.

The day session, after changing the opening of the afternoon session from 1 o'clock to 1:30, opened and closed promptly. The president of the county Institute society, Judge Russell, was in constant attendance and presided gracefully at every evening session and was alert to keep things moving. The chairman of the local committee, Harry Royal, was a host, and always near at hand, ready and affable.

The evening sessions were well attended by a dignified, well behaved audience of people, including many young people. The music, under the management of the school principal, Mr. Clark, was admirably planned and a constant satisfaction. The attendance of classes from the high school at Prof. Woodworth's lecture every day was an interesting and suggestive feature.

The criticism upon the evening sessions was that the general topic was not well analyzed and the local speakers did not seem always to have been indoctrinated with the scheme of treating thoroughly some sub-topic under the general title and doing it thoroughly. Still the president of the Institute societies and others made up for this in large part by their apt and ready addresses.

If greater attention had been given to the issuance of an absolutely correct and tasty program and a little more attention had been given to the reception of outside guests, the Institute would have been a model of its kind. There was so much to commend in it that I have hesitated to even offer these slight criticisms. The long Institute is certainly a success and we should have more of it.

CHAS. W. GARFIELD, Conductor.

OGEMAW COUNTY—ROSE CITY:. From the point of numbers the Ogemaw county Farmers' Institute was not a great success, and it was a disappointment that but two of the five local speakers, whose names appeared on the program, were on hand to fulfill their obligations to the society. The very bad condition of the roads and the sad lack of advertising by the local management probably account for the disappointments.

Even the janitor of the hall, if there was one, did not know when the meeting was to be held and the room was cold except as the fire was kept up by those in attendance. Thanks are perhaps due to those who unknowingly furnished wood to keep up the fire.

The discussion of the topics on the program brought out the fact that, as a rule, the farmers of this county are progressive men and women, keeping well abreast of the times. The importance of keeping live stock on the farm is appreciated; interest is manifested in the improvement and better care of farm animals. There are more good butter makers among the women of Ogemaw county than in many of the lower counties. The questions of forage crops and of orchard fruits were very profitably discussed.

There was a marked interest in the subject of the farmer's home and its surroundings.

The chief criticism of the Institute would fall upon those who were not there and upon the local management who were in part responsible for their absence. There was a lack of feeling of responsibility for the success of the Institute on the part

of the business men of Rose City, and whatever success there was, was due to the interest shown by a few farmers.

GORDON H. TRUE, Conductor.

OSCEOLA COUNTY—HERSEY: When we arrived in the village of Hersey we found the schools closed on account of diphtheria. Notwithstanding this scare most excellent arrangements had been made for the meeting and the attendance was much larger than expected under the circumstances. Many drove in from distant parts of the county and remained through all the sessions. The subjects of greatest interest were stock raising, the growing and storage of fodder crops, potatoes, and fruit. The sessions were most ably conducted by the president and secretary and the Institute was a success.

H. P. GLADDEN, Conductor.

OSCODA COUNTY—MIO: Mio is unfortunate in not having a railroad, in fact the county labors under great disadvantages on this account. As is often the case, however, a very successful meeting was held, farmers and their families driving in from miles around. Just the conditions existed which please the man who is to talk to an audience on farm topics, namely, the audience was made up of farmers and their families, deeply interested in the subjects presented. There are many enthusiastic young and middle aged farmers within a radius of ten miles of Mio who are doing much to develop the resources of the county.

H. W. MUMFORD, Conductor.

OTSEGO COUNTY—GAYLORD: Gaylord is the most elevated town in the southern peninsula. It has a substantial and thrifty air about it that is very encouraging. The attendance was good and the interest unflagging.

W. J. BEAL, Conductor.

OTTAWA COUNTY—HOLLAND: This was the first Institute held in Ottawa county under the present law, and it was a decided success. The Hollanders are remarkably intelligent and progressive people.

ROLAND MORRILL, Conductor.

ROSCOMMON COUNTY—ROSCOMMON: All sessions but the evening sessions, when a large number of town people came in, were poorly attended. This was partially due to the lack of proper advertising and hustling among the farmers throughout the county. And by the way, few appreciate the amount of work necessary along this line, that is, to properly advertise and interest the farmers in a Farmers' Institute, especially in a county with a limited number of farmers. To do it successfully the local officers must be more interested in such a meeting than in any other subject, *politics* not excepted.

H. W. MUMFORD, Conductor.

SAGINAW COUNTY—CHESANING: The Institute was well attended and considererable interest was shown in most of the topics. The importance of the beet-sugar industry was strongly presented by Senator H. M. Youmans, and many questions were asked as to the practical benefits to be expected by the farmers from the proposed bounty law. The discussions on butter-making, roads, bridges, and drainage, brought out both practical objections and helpful suggestions. Some of the papers, however, were not as fully discussed as could have been desired.

WALTER B. BARROWS, Conductor.

SANILAC COUNTY—CARSONVILLE: Every condition for holding successful Institutes seemed to be present at this point. The local speakers did their part well. The audience handled the topics well and the music furnished would be a credit to any city in the State, being in great variety and all of highest quality. After the close of the Institute the members formed a farmers' club and propose to hold frequent meetings. We shall expect a fine Institute in this county in 1898.

ROLAND MORRILL, Conductor.

SHIAWASSEE COUNTY—LAINGSBURG: The interest throughout the entire Institute was very good. In the discussions every moment was well occupied, with a disposition to prolong them beyond allotted time. In this locality the people are reported largely as German, and it being the first Institute held in this part of the county they did not turn out so well locally. The secretary and president as well as others are to be commended for efficient work. The cold weather and storms had much to do with light attendance.

R. M. KELLOGG, Conductor.

ST. CLAIR COUNTY—EMMET: As predicted in the last Institute bulletin the St. Clair Institute was in safe hands. Every session was called promptly on time and at many sessions the hall proved to be much too small. Many went away, being unable to gain an entrance. Every one assigned to a place on the program was present and every topic seemed very interesting. Mr. King, the president, kept everything moving and the interest in subjects before the Institute was kept at white heat at all times. The people of the small village of Emmet and of St. Clair county may well feel proud of their meeting.

C. B. CHARLES, Conductor.

ST. JOSEPH COUNTY—THREE RIVERS: The Institute was a success in every respect. Attendance was large and all seemed to be interested in both local and State speakers. The women's section was very largely attended. The hall for this meeting was tastefully decorated, and well warmed. The local officers had done everything possible to make the Institute at Three Rivers a success. Good ushers were in attendance so everyone was provided with programs and question blanks. The cordial and hearty welcome of Mayor Bumphrey could but make everyone living out of the city feel at home. The topics were well selected for this section, and program well arranged.

There were two features of this meeting worthy of special mention. One, the giving of one evening of the general session to women speakers. The other, selecting topics for general session not likely to interest ladies, during the women's section. General good feeling seemed to prevail, and many were the regrets that the Institute had to come to an end. The program was so full, and such deep interest taken, that both evening sessions were continued until a late hour with unabated interest.

J. N. STEARNS, Conductor.

TUSCOLA COUNTY—VASSAR: This is one of the best agricultural counties in the State, and the Institute was one of the very best held this year. The hall was good, attendance good and the Institute abounded in good talks, papers, music, and original poems. The local poet was there with a poem to fit any occasion. The president was right at home, he being an old supervisor from away back. The secretary did not take an active part, as he ought to have done, but for all that everything went off without a jar. Discussion was a little slow at first, but after getting stirred up, was all that could be desired. The only difficulty was, that time was too short. I think that two papers well discussed are much better than three poorly discussed. The best of feeling prevailed, and Tuscola county knows how to appreciate an Institute as well as hold one.

I. N. COWDREY, Conductor.

WASHTENAW COUNTY—CHELSEA: The sickness of secretary and lack of co-operation of other officers under the circumstances failed to get the people interested and hence failed to secure as large an attendance as there should have been. The interest throughout was good and subjects intelligently discussed. The papers were prepared by those who were competent and presented—mostly by the aid of notes—in an interesting manner. Whatever lack there may have been was from working up a general enthusiasm in advance.

R. M. KELLOGG, Conductor.

WAYNE COUNTY—PLYMOUTH: The Institute was well attended by representative farmers who gave abundant evidence of their appreciation by the closest attention and their interrogations throughout every session. At no time did the interest

lag, and when opportunity came for general discussion every moment was promptly accepted and intelligently occupied and constituted really a model Institute. If the farmers who have attended these Institutes for the last few years could be heard and heeded the legislature would make such an appropriation as would enable the local society to hold at least three or four Institutes in all counties where the population is sufficient to justify it. The dairy interest, gardening, and small fruits are interests receiving more attention than formerly in this county.

R. M. KELLOGG, Conductor.

WEXFORD COUNTY—SHERMAN: The Institute held in Sherman was fairly well attended by an intelligent and enterprising agricultural community. Men and women interested in the improvement of their farms and their surroundings. The interest manifested encouraging. The local part of the program was well carried out; the music excellent and the comfortable church occupied highly appreciated. The officers were efficient and courteous, and the success attending this Institute will be the means of creating a greater interest in those to be held in the future. A local farmers' organization is to be formed, which will add strength to future work.

WILLIAM BALL, Conductor.

SECRETARIES' REPORTS.

We asked secretaries of Institute Societies to make brief reports for publication. The following is a copy of circular sent them:

We wish you would kindly return this slip at as early a date as convenient, together with a written statement, for publication in our next annual Farmers' Institute bulletin, which will give us an idea of the success of the last State Institute in your county, and something as to your methods. We want these reports from each county, and wish secretaries would tell both of their successes and failures, so that other secretaries may gain information from reading the reports.

The following questions will partially indicate the scope of the report we wish. We trust you will give this your early attention:

1. What success attended your last State Institute as regards attendance, discussions, interest, enthusiasm, etc.?

2. What was the general effect of the meeting, do you think, upon the farmers and the farming of the county?

3. Did you have any trouble about securing local speakers and getting them to actually take part?

4. Did you have an exhibit of farm products? Was it a success?

5. Did any farmers in your locality carry on any of the coöperative experiments suggested last spring?

6. Have you held any extra meetings of your own during the past year? If so, with what success?

7. What methods do you practice in advertising your Institute, and how successful are they?

8. What was the cost of your last meeting, and for what purposes?

9. Have you any special features and methods in Institute work that you find helpful and valuable in getting up a program, carrying on the meeting, or otherwise interesting people?

10. What was the general impression among the farmers in your county regarding the value of our Institute work?

We have printed the name and address of the secretary of each society *for last year*, he being the one responsible for the reports.

ALCONA COUNTY—HARRISVILLE: Our Institute was not what we hoped as to numbers, but a good degree of interest was shown by the few farmers who attended regularly.

The local speakers were not very much in evidence; however, considerable animation was exhibited in raising questions, and discussing same to the mutual benefit of all.

We were highly pleased with the speakers you sent us, and especially with the conductor, Mr. Roland Morrill; he is a host in himself, and we should be very glad to see him again. We wish especially to speak in the highest terms of the good work done by Mrs. Mayo; our wives and daughters give her great praise, and should she, or some one as good, come to our next Institute, great interest would be taken by the ladies.

We have taken steps to secure workers for our next Institute, and we will double our energies, and by a more thorough system of advertising hope to make a success.

The Institute work is worthy of the highest commendation, and should be appreciated and aided by the farmers of Michigan with grateful hearts.

GEO. W. COLWELL, Harrisville, Secy.

ALLEGAN COUNTY—ALLEGAN: We feel that our Institute was a complete success. The attendance was good during the whole session. Farmers feel that the Institute is a good thing and will attend with greater enthusiasm the coming years.

We had no trouble in securing coöperation in local talent.

We had a fine exhibit of apples and potatoes. I know of no special experiments in any line of farm work in this vicinity.

We have held no extra meetings during the year.

We advertise through local papers and printed handbills.

The cost of our last meeting approximated $16.00.

L. C. ROOT, Allegan, Secy.

ALPENA COUNTY—ALPENA: Our meeting we considered a success for this county. The interest is growing, and we expect a large meeting next winter. The speakers and topics gave satisfaction. The Institute certainly exerted an influence for good among our people.

E. H. TOLAND, Ossineke, Secy.

ANTRIM COUNTY—MANCELONA: 1. The attendance was slim, caused by the cold, stormy weather and poor roads. Hardly any from a distance in attendance. Discussions were entered into with interest on all subjects, especially on silos and silage.

2. It waked them up to the importance of getting together and discussing all subjects pertaining to farmers and farming, and the necessity of being able to get up before an assemblage and express their ideas in an intelligible manner, and of the importance of using more care and study in the planning of farm operations.

3. Yes, we did; those near by came to time fairly well, but those from a distance failed to materialize.

4. Nothing but apples and potatoes. Isaac Willcox and C. E. Mills had fine exhibits of apples, while your humble servant had nineteen varieties of potatoes, grown experimentally, that attracted considerable attention and discussion.

5. Only myself, with potatoes, mentioned above.

6. No.

7. By notices in the county papers and through the vice presidents; they reach a good majority of the farmers. There are a good many—(I can't call them farmers)—that should be taken by the ear and led in to the feast, and when they have partaken once they would be quite liable to come again. These are the ones we should grasp and try to pull in and get them interested, then we could do them some good, but how best to do it I shall not attempt to tell.

8. About $7.00; printing programs and slips, $4.75; postage and stationery, $2.25.

9. No. We held close to the recommendations of the superintendent.

10. The farmers in attendance express themselves as well pleased with the workings of the Institute.

D. W. MARSH, Mancelona, Secy.

ARENAC COUNTY—STANDISH: Our Institute was considered a success. We had a good attendance. One of the special features was a picnic dinner the last day. Doubtless this attracted many people to the meeting. Our society was organized only last fall and the work was new. I think there will be an increased interest the coming year.

A. H. WELLES, Standish, Secy.

BARRY COUNTY—HASTINGS: 1. The Institute was not a success.

2. Nothing, for the farmers were not there.

3. You furnished the speakers, so of course there was no trouble.

4. No.

5. I think not.

6. No.

7. Gave notice in all the county papers, and sent programs to all members of the society and others who will be likely to be interested. It was not successful this year.

8. Perhaps $25. Programs, postage, janitor's fees, etc.

10. I think those who attend the Institutes consider them profitable.

R. M. BATES, Hastings, Secy.

BAY COUNTY—AUBURN: Auburn is a little town in the western part of the county, the centre of a good farming country. The Institute gained a fair attendance, but not so large as its merit warranted. It was hard to get our committees at work. I think as knowledge and appreciation of the work grow, we shall have as good Institutes as in any county in the State.

E. R. PHILLIPS, Bay City, Secy.

BENZIE COUNTY—BENZONIA: The Benzie county farmers' Institute was held at Case's hall, Benzonia, January 8 and 9. Although the weather was threatening, the attendance was good and increased with each session, thus affirming the old saying that the proof of the pudding is in chewing the string. Much interest was shown in the subjects presented, as the discussions were lively and taken part in generally.

Fruit raising, the dairy, forage crops, and soil fertility were each treated in an intelligent and interesting manner, which cannot but be profitable to every listener who is interested in those questions. The papers presented by local talent were carefully written and proved that the writers were well acquainted with their business. Benzonia has a reputation for good music, and that furnished at the sessions of the Institute was certainly up to the standard and was appreciated by the audience, if encores are a criterion.

This system of Institutes cannot help but be of immense benefit to those interested in agricultural and kindred pursuits, and no effort should be spared to induce those who are interested to attend these mind feasts.

R. B. REYNOLDS, Frankfort, Secy.

BERRIEN COUNTY—NILES: The meeting was a grand success in every particular, both in attendance and interest. The discussions were lively and enthusiastic. The general effect was most excellent, and I have heard nothing but praise and words of good cheer for the first-class Institute held here. The local speakers responded very readily with a few exceptions, but the time was so well taken up that what appeared to be a vacancy, when we came to it, was no vacancy at all. Prof. Smith has the faculty of filling up the gaps in a program with the precision and alertness of a military commander.

We had some excellent farm exhibits, which were an interesting feature of the meeting. No part of the program was more interesting or brought out more discussion than the farm exhibits and the experience of the experimenter. The exhibits were by farmers who carried on the coöperative experiments as suggested by you last spring.

No extra meetings held during the year. I think that it should be the duty of each vice president to organize his township into a township Institute society, to be held monthly.

Cost of last meeting to the society, $19.58, for printing and paying musicians, janitor, etc. No special meeting held by the officers only to arrange for the Institutes. The impression was good, especially with the *up-to-date* farmers.

C. B. GROAT, Niles, Secy.

BRANCH COUNTY—COLDWATER: 1. Large attendance; discussion on several papers very lively, others not so general; interest good all through; deeply in earnest, if that is what you mean by enthusiasm.

2. I think general effect upon those present will be to stimulate interest in different methods, which may result in some advance.

3. Had no trouble in securing local speakers; but one failed to appear, but he later wrote that he was suddenly called away.

4. We had no exhibit of farm products, as that has not yet seemed feasible.

5. I am unable to positively state; but my impression is that none were attempted, although I wrote to several persons last summer about it, inclosing your circular regarding the experiments suggested.

6. No extra meetings as an Institute society have been held, Pomona Grange seeming to take its place very acceptably.

7. Use the newspapers freely; begin early; enlist the vice presidents; a short time before the Institute is held send programs to vice presidents for distribution; enlist the Granges, especially Pomona, because so many farmers attend their meetings.

8. Thirty-eight dollars and fifty cents, divided as follows: Hall rent for Institute and Women's Section, $20 and $4.50 respectively; printing, $7.00; music, $5.00; miscellaneous, including postage, $2.00. We also have nearly $16 on hand to begin next year's work with.

9. No special features or methods. We aim to make the musical program of as high order as possible from the best local talent in the county, and it has generally brought forth very commendatory remarks.

10. This was not in any way spoken of at the Institute; but I think there is a growing sentiment favorable to their continuance at present.

A. J. ALDRICH, Coldwater, Secy.

CALHOUN COUNTY—ALBION: 1. The Institute was in all respects a success. Though the attendance was not as large as one year ago at Battle Creek, yet the eastern part of the county was fairly well represented. The average attendance was 234, with larger attendance at afternoon session of last day, 350; evening of last day stormy weather, reducing the attendance to 100. Discussions ready and lively, but not general enough among audience.

2. As far as I could learn, the general effect was good.

3. The responses of local speakers was prompt. One paper was sent in to be read. All others appeared in person.

4. Invitations were sent out requesting exhibits. None were made however.

5. Two farmers in the county carried on coöperative experiments; one with rape for pasturage, which was successful and quite satisfactory; one with varieties of potatoes, which was nearly a failure as to crop, due largely, we think, to clay soil and heavy rains.

6. We have held no extra meetings during the year.

7. We advertised our Institute through the press of the county, some twelve papers of the county promptly publishing free whatever matter we furnished. Short sketches of the speakers, with attention called to their topics. Also special cards of invitation addressed to five or six in each township. Programs sent out in envelopes of society, with following printed on outside: "Farmers please note enclosed important program of the State Farmers' Institute. Be sure and come. Tell your friends."

8. The cost of last meeting was about $30, for halls, advertising, postage, etc. Programs were printed free by Gale Manufacturing Company.

9. The music and recitations were helpful in interesting the people, they being of an unusually high order of merit.

10. We did not hear many opinions expressed as to value of Institutes. So far as heard was "good," "helpful," "well pleased," "would not have missed it for anything."

W. A. POWELL, Marshall, Secy.

CASS COUNTY—CASSOPOLIS: Our Institute, notwithstanding the stormy weather, was an unqualified success. The attendance was good and every subject taken up was discussed to the full limit of time, while many discussions were cut too short. If there was any failure in our Institute it was in not providing time enough for discussions. The interest and enthusiasm continued to the end, and no one coming there for instruction went away dissatisfied.

The great trouble with the farmers is that they do not put into practice the valuable things they learn, and while they intend to do so at the time they learn them at the Institute, they are either forgotten or put off until next time. There is no question but that these Institutes are of vital importance to the farmers, and that all who attend them feel so. Those that kick against them are those farmers who never attend the meetings, and in fact any meetings, and consequently do not know what benefit accrues from an interchange of ideas.

We had some trouble about securing local speakers, and it is my opinion that fewer local speakers and more discussions would be an improvement. We had no exhibit or coöperative experiments.

Our method of advertising the Institute, beside the notices in local papers, was to furnish each vice president twenty-five or more programs and make it his duty to see they were placed with parties in his township who would take an interest in the Institute and tell the neighbors.

Our expenses were for programs and warming church for Women's Section and few incidentals, about $8 in all.

W. W. REYNOLDS, Cassopolis, Secy.

CHARLEVOIX COUNTY—EAST JORDAN: The Institute was a success in every way. The severe storm of the preceding three days prevented as large an attendance as was expected, but every session was attended by a sufficient number of practical farmers to make every discussion lively and instructive.

The Granges from the surrounding county each had a delegation present, and their reports at home will scatter the knowledge gained on the various farm topics broadcast in the county.

Our program was somewhat interfered with on account of storm-bound absentees, but in the main was carried out very creditably.

Our meeting was thoroughly advertised in all the county papers, and handbills were sent out as a reminder.

We did not attempt to make any exhibits at this meeting, but will at future meetings.

Financially the meeting was a success, and our treasury contains over $27 after paying all expenses. A great deal of credit is due Mr. Asa Loveday of East Jordan for the interest manifested in the success of the meeting by circulating a petition for subscription to an expense fund for the society; nearly $20 was collected.

The society expects to hold a one-day meeting in Charlevoix some time in March.

E. B. WARD, Charlevoix, Secy.

CHEBOYGAN COUNTY—CHEBOYGAN: This Institute, being the second held in the county, was marked with increased interest. Every paper and discussion held the attention of all. Though the attendance was small, it was composed of a sprinkling of the whole county, and is sure to pave the way for a larger attendance next year. There is still a lack of knowledge among the farmers as to the import of this work. Great credit is due the State speakers. Mrs. Mayo's talks were intensely interesting and practical, while the discussion on "forage crops" set the farmers all talking at once.

We had no trouble in securing local speakers.

We advertised in all the local papers, by various articles, by "bill-posters," and by 1,000 little cards. For the next Institute we are thinking of writing up a leaflet in connection with the program, going into the subject more in detail, distributing through postoffices and schools.

C. F. SMITH, Cheboygan, Secy.

CHIPPEWA COUNTY—SAULT STE. MARIE: Our Institute was better attended than a year ago; the interest was greater; the discussions were more animated. Our people believe in the Institute and will give an increasing support. The State speakers suited us well. The women's section was a success.

T. R. EASTERDAY, Sault Ste. Marie, Secy.

CLINTON COUNTY—ST. JOHNS: Owing to the prolonged session of the circuit court it was impossible to use the court house as was advertised. Thursday forenoon and afternoon sessions were held in Newton hall and Friday forenoon and afternoon in Sciven's opera house, and the evening sessions were held in the court house.

Attendance was fair and interest good.

GEO. N. FERREY, St. Johns, Secy.

CRAWFORD COUNTY—GRAYLING: The attendance at our meeting was better than last year, but not as good as anticipated or wished. The discussions were very interesting in all the branches of the program. The farmers are well satisfied and I know it will tell on their farms hereafter. Some of our local speakers made themselves very conspicuous by their absence.

We had a good exhibit of farm produce and fruit. No coöperative experiments were carried on in this county last year. No extra meeting last year.

We have our program published in our local papers and have notices in the locals to bring it to everybody's notice. The State speakers were excellent, according to all reports that come to me. The exhibition of grasses by Dr. Beal was a great attraction. Such exhibits will draw an audience.

The cost of our last Institute was $2.50 for programs.

HENRY FUNCK, Pere Cheney, Secy.

DICKINSON COUNTY—NORWAY: Our people showed a lack of interest, although the Institute itself was interesting and profitable. Those who did come were pleased. I think that in course of time our people will appreciate the meetings. We sent out many personal letters, and tried to work up an interest.

L. F. SPRINGER, Norway, Secy.

EATON COUNTY—CHARLOTTE: The program included the following: Address of welcome by Vice President Fairfield of Eaton Rapids; response by Prof. Barrows; Orchards for profit, Lafayette Tubbs, Eaton; Insects of the garden and orchard, Prof. Barrows; Clover, manures and fertilizers, John L. Shawver, Bellefontaine, Ohio; recitation, Miss Martha Lee, Carmel; An outlook on farming, Ara Weldon, Eaton Rapids; Farm buildings, John L. Shawver; The ideal home and its moral influence in the community, Belle M. Perry, Charlotte; Reform in school methods, F. A. Osborne; Feeding of the dairy herd, E. S. Stacks, Potterville; The farm dairy, H. E. Van Norman, Agricultural College; Parasites of domestic animals, Prof. Barrows; Immigration and undesirable immigrants, B. L. Bentley, Eaton Rapids; Home life on the farm, Mrs. Mary A. Mayo, Battle Creek; recitation, Geo. L. Boyers; Markets, Dr. Howard Edwards.

Earnest and interesting discussions followed each and all the topics, including the following which were heard in the women's section, which was ably managed by Mrs. Mary A. Mayo, of Battle Creek: Poultry raising by the farmer's wife, Mrs. Mayo; recitation, Miss Martha Lee, Carmel; Our Boys and girls, Mrs. W. R. Quantrell, Benton; The unappreciated side of farm life, Mrs. Mayo.

All in all, the Institute was one of the very best ever held in Charlotte, where Institutes have been a feature of the annual meetings of our county agricultural society for many years. The farmers get much help from the able lectures of the professors and no doubt, in turn, do much to broaden their more cultured brethren.

The Institute is a good school and our citizens, many of whom are not particularly interested in agricultural pursuits, have come to learn that the feast of reason and flow of soul at these Institutes is a good thing to enjoy.

GEO. A. PERRY, Charlotte, Secy.

EMMET COUNTY—HARBOR SPRINGS: Our farmers' Institute was well attended for a thinly settled county, the last day's meetings having about 200 each time; being about all our hall can seat. Discussions, interest and enthusiasm were all that could be desired; it being necessary to call a halt upon several occasions. There can be no doubt that the effect of the meeting upon the farmers and villagers too, was excellent. They all enjoyed the meetings and hated to see them close.

Had very little trouble about getting local speakers, except from poor train accommodation between here and Petoskey, which prevented three or four speakers remaining the last evening to talk on subject of good roads, but their places were easily filled from this side and nobody cared to leave until the lights were put out.

Only a few brought farm products, but so much interest was taken in these exhibits that I feel sure there will be a good show next year.

No farmer reported any co-operative experiments. No extra meetings were held during the past year. One was voted to be held in April and more talked about last year, but the officers did not feel willing to give their time and energies to such work free of cost during our short money making season.

The meeting this month again requested extra meetings this coming winter and it was voted to let the vice presidents attend to these extras in their respective township. Dr. Worden of Maple River township, says one will be held in her township at Alanson village.

We leave the music in charge of a chorister and let him take care of the whole. Good solos, duets, quartettes, etc., rest and please the people. All say we are doing a wonderful work. Interest grows each year.

We give notice through each of five county papers for a month or more and tell all we see in town. On the day of Institute we put up posters in postoffice and other public places, "Farmer's Institute To-day in County hall." This calls attention to the day. Cost $4.00 for programs, $4.00 for janitor and drayage, $2.00 for postage and incidentals: $10.00.

JOHN SWIFT, Harbor Springs, Pres.

GENESEE COUNTY—FLUSHING: 1. Our Institute was a grand success, and was largely attended at each of the six sessions. The audience was composed of both old and young people. A special effort in advertising was used to induce the young people to attend and in doing this we added much to the success of the Institute.

Our papers were good and nearly all of them well received, which was evident by the manifest interest and enthusiasm which was displayed at each session. Most of the papers and topics were liberally discussed, and in most cases the interest in the discussions of the various topics was very animated and had to be closed for lack of time, which we regretted.

2. The effect of the meeting was good and the people seemed very much pleased with the work of the institute, and I am confident the Institute was productive of very much good.

3. We had no trouble about securing local speakers for the various topics, and all those who promised to be present and read papers and take part in discussions were present with one exception, and he was detained at home by sickness. On a few of the topics I felt that the discussion from the audience was not what it should have been; and I would here suggest that the State board should consult with the local managers of the Institute in the selection of topics, for the topics that might be of interest in one locality might not prove to be of interest in some other locality. [This is done in every case. SUPT.]

4. Did not have any exhibits of farm products.

5. There were no farmers that I know of in this county who carried on any coöperative experiments.

6. We have held no extra meetings of the society the past year.

7. In advertising we used the local columns of our county papers by writing up good sharp locals for weekly publication, which was commenced some six weeks previous to our Institute. In these we urged the farmers of the county to

attend our Institute. We also on all occasions when in the presence of farmers talked Institute.

8. The cost of holding Institute to the society was about $16.00, and in addition to this the people of Flushing furnished the hall and music, which cost them $22.00. The $16.00 was for printing programs, paying expenses of local speakers, railroad fare, etc., and $3.00 paid one young lady for recitations.

9. In getting up an Institute, would have a variety of practical topics, and would leave all time possible for discussing the same. Would have good recitations by *good looking* young ladies sandwiched in freely between topics, and not too much music.

10. The general impression among the farmers was favorable to the Institute work, and the Women's Section was well received.

JAS. A. BUTTON, Flint, Secy.

GLADWIN COUNTY—GLADWIN: 1. Attendance was fair and the discussions and interest were good for the number that were there.

2. The general effect, I think, was good.

3. We did have trouble to get local speakers and to get them to actually take part.

4 and 5. All the exhibit that we had was some potatoes that were raised from seed sent out from the College last spring. H. R. Clark and myself were the only ones that tried any of the experiments, and we only tried on potatoes.

6. We have not held any extra meetings.

7. We advertise by handbills and notices in the local paper, and it is well known when the meeting is to take place.

8. About $2.50 for advertising and postage.

9. We have no special features or methods.

10. The general impression was good.

E. O. LAMPHEAR, Gladwin, Secy.

GRAND TRAVERSE COUNTY—TRAVERSE CITY: For several years the farmers of this county have held an annual Institute, sometimes with a little help from outside speakers, but more often entirely within themselves.

This was the first Institute held after organizing under the present State law, and will go down to local history as one of the best and most helpful ones ever held in the county. The Institute was held earlier than usual and the attendance was not so large as at some former meetings, but Grange hall was well filled at every session with an audience ranging from 80 to 140 of the most enterprising farmers and fruit growers of the Grand Traverse region. The topics discussed by the speakers furnished by the State Board of Agriculture were well adapted to the needs of our people and brought out lively and interesting discussions, the general effect of which must lead to more thorough and thoughtful attention to the details of farm and orchard management.

The Women's Section, in charge of Mrs. Kennedy, was well attended and greatly appreciated by the ladies.

There was no difficulty in securing local speakers and getting them to perform their part on the program.

No attempt was made at an exhibition of farm products, though samples of excellent corn and apples were displayed.

We were too late in organizing to do much with the coöperative experiments suggested by the superintendent; some of them were tried, however, and will be repeated again next year.

We have held no extra meetings during the year.

The county papers gave valuable assistance in advertising the Institute, and programs were thoroughly distributed throughout the county.

The local expenses were as follows:

Rent of Grange hall	$5 00
Janitor of church (women's section)	50
Music	10 00
Printing programs, etc.	5 50
Postage	1 78
Total	$22 78

It was suggested that in future we try to arrange for a young people's section, with a program adapted to interest them in rural affairs and agricultural education; also for a social session or reception of some kind for the purpose of getting better acquainted.

The general impression was that the present system of Institutes should be encouraged and continued, as shown by the resolutions adopted.

E. O. LADD, Traverse City, Secy.

GRATIOT COUNTY—ST. LOUIS: Held Round-up Institute. See p. 1.

HILLSDALE COUNTY—HILLSDALE: The Institute labored under the disadvantage of having its sessions on two of the stormiest days in the coldest week that we had during the winter. From the beginning to the end of the Institute the thermometer ranged from zero to 10 degrees below, and the air was full of snow with the wind blowing quite a gale. This deterred those who had any considerable distance to drive, from getting out. And then, to add to the ill-conditioned state of affairs, the opera house, in which our sessions were held, was so cold that it was impossible to keep comfortable and many left after attending a short time. Those who "held the fort" and remained to listen to the excellent papers and discussions expressed themselves as well paid.

I wish to speak especially in commendation of the paper given by Mr. A. M. Welch, of Ionia, on the "Silo," and the subject, "Fruit Growing in Southern Michigan," by Hon. L. D. Watkins, of Manchester, as being of great interest to the audience present and express for the farmers of this county the wish that at our future Institutes we may have more of just such practical, energetic talks.

We think that an item which added to the attractiveness of our program was occasioned by a system of "exchange" of speakers with adjoining counties so that in addition to those furnished by the State Board of Agriculture nearly all our speakers were from outside our county; and I recommend this idea to the consideration of other counties where it may be found practical.

EARL H. DRESSER, Jonesville, Secy.

HURON COUNTY—BAD AXE: The Institute held in the court house at Bad Axe this year was a grand success. By the close of the first session we had between 150 and 200 farmers, who came to stay as long as the Institute would last. At the second session, although the ladies had to adjourn to attend the Women's Section at the church, to hear a very interesting talk from Mrs. Mayo, which was highly appreciated by all, when we returned to the court house we found it well filled with an interested audience. At our evening session a great number of our townspeople were present to hear President Snyder of the M. A. C., Mr. Spencer, our county school commissioner, and Mrs. Mayo. All these led along the line of practical education, and were greatly enjoyed by all those who were fortunate enough to get inside the doors, for many had to return to their homes unable to get in.

The opening the next morning found the house well filled, and the program as published was well carried out, not one speaker failing in attendance. Our space forbids a fair resume of the papers presented, and our regret is that we have not a hall sufficiently large for the accommodation of all. While the court house at every session was well filled, in the evening the house was filled to its utmost. Our conductor was an experienced and practical farmer, and gave the people some sound teachings on business habits in farming. The instructors were all interesting and practical, arousing much profitable discussion on the part of the farmers.

Farmers in general appeared to be well satisfied with both the speakers and subjects. The topics were well adapted to this part of the country and the speakers were men of experience.

We had a small exhibit of farm products, such as roots, apples and grain; also bark scales, which brought out considerable discussion and was explained to the satisfaction of all by Conductor Morrill. Much interest was manifested throughout the entire sessions, and at the close a unanimous vote of thanks was extended to the Board of Agriculture for sending us such an able and practical body of speakers.

Our expenditures would not exceed $10, which was used for printing, postage and stationery. Our county editors, about ten in number, gave us free use of their columns, of which we took advantage with much satisfaction. We find talking

over the Institute work at our county Grange quite a benefit; also in having enthusiastic vice presidents who will keep alive and stir up their respective townships and secure new members. Then by calling together all vice presidents once a year. If they have been faithful to their office, we can soon know the desires of the county and plan our work accordingly. At this last meeting we have taken the names of both men and women that have promised to keep a record of the profits and loss in farming and report at next Institute.

MRS. GEO. PANGMAN, Verona Mills, Secy.

INGHAM COUNTY—STOCKBRIDGE: The Institute was all its projectors had hoped or planned for. The new town hall made the most comfortable and commodious place for exercises of this character. The attendance was larger than was anticipated, indeed the hall was well filled both evenings. The interest from start to finish was good, no time being allowed to go to waste. All agreed that it was a profitable and interesting gathering.

The local speakers came to time in good shape—as did nearly everyone named to lead in the discussions.

So far as known no farmers in this section entered into the coöperative experiments. No extra meetings were held during the past year, but the officers have the matter under consideration for the future.

For advertising the county papers very generously gave all the space desired. The society issued five hundred program-folders—of convenient size for ordinary envelope. The total expense borne by the association was but about $15. This included hall rent, programs, postage and stationery, etc. Only 31 farmers paid their dues. This number would have been doubled had those present from other counties been allowed to join the association. Considerable numbers were present from Jackson, Washtenaw and Livingston counties. It seems to me the law should be so amended as to allow any farmer to join where most convenient for him.

I believe the interest to be increasing. The idea of a vice-president in every township is no good in this county. Probably ten out of the sixteen have never joined the society.

Only words of praise were heard of Mrs. Mayo's heart to heart talks with mothers and daughters. The M. E. church was crowded during the afternoon session, every available seat being occupied.

L. H. IVES, Mason, Secy.

IONIA COUNTY—IONIA: The past year has been one of activity in Institute work in Ionia county. August 12 we held a summer Institute at Saranac of one day. We made this a horticultural Institute. Mrs. Mayo was with us in the evening. To say it was a success would be telling only part of the story, as many had to leave for lack of room and we took care of over 600.

Our winter Institutes consisted of five one-day meetings, with Hon. Wm. Ball as State speaker, held respectively at Portland, North Plains, Belding, Clarksville, and Lake Odessa, followed by a three days' meeting at Ionia. At the one-day meetings we had an average attendance of over 200, with good programs and papers, fine interest, lively and instructive discussions; all present pronounced them a success and wished for their continuation.

The Institute at Ionia was handicapped by excessive bad weather, but we had an average attendance of about 300, with Mrs. Mayo in charge of the Women's Section which was largely attended by the ladies from the city. All spoke in the highest terms of Mrs. Mayo and her work.

In arranging the program we designed to leave nearly as much time for discussions and questions as to papers, but found that the interest was such that we lacked time for this line of work. On nearly every paper we had to cut the discussions short for lack of time, showing that those present were there for the purpose of gaining and giving information and not for pleasure only.

Our method of getting up a program has been for the executive committee to decide what topics they want discussed at the Institute, being careful to reach as many branches of farm work as practicable, then to secure those best adopted or qualified from practical experience to treat the subject. With us it has worked satisfactorily.

In the way of advertising, we use the papers freely and have found personal postal card invitations a great help.

The impression is gaining ground that the Institutes are an educator and a great help to the thoughtful, progressive farmer. In fact many of our farmers begin to look upon the Institutes as a necessity in helping them to keep abreast of the times.

C. I. GOODWIN, Ionia, Secy.

IOSCO COUNTY—TAWAS CITY: The Institute was held at the court house and was much better attended than a year ago. The different topics on the program received the full attention of all. No trouble was had in securing local speakers. Only one failed to attend and his topic was taken up in general. Farmers made no exhibit, as they do not think it of any use or value.

The local press was used for an advertising medium. Rev. A. C. Kay gave lectures throughout the county on Farmers' Institutes. Myself and others interviewed farmers in general. In my opinion these methods of advertising should be among the best to gain coöperation. The cost of our advertising will not exceed $7.

I think some local topic should be included in program to help stir up enthusiasm—say, for instance, "How to Reduce Taxation," or "Primary Elections"—anything which is under discussion about the time of holding the Institute. Farmers as a rule are very slow in turning out to Institutes and much disappointment is in store for the managers of the Institute.

The general impression among farmers present was very complimentary to the work of your speakers. A vote of thanks was extended at the close to all taking part in the Institute. No local meetings were held during the past year; it needs more education in that line to stir up enthusiasm among farmers. I am convinced if local meetings could be held our Institutes would receive better patronage from farmers. Our society has gained a good many members this year and it is hoped that they will help to strengthen the society for the coming year.

GEO. C. ANSCHUETY, Tawas City, Secy.

IRON COUNTY—IRON RIVER: The second annual meeting of the Iron county Farmers' Institute was in most respects an unqualified success. The attendance at all the sessions was much larger than at first meeting and the interest and enthusiasm of those attending was quite manifest, especially in the manner in which many of the farmers took hold of the discussions.

2. The effect of the meeting upon those attending is of course necessarily problematical, as most of our farmers are of foreign birth, and it is quite difficult at this time to tell just what effect the meetings will have on them; but if enthusiasm and interest in the various sessions is any criterion to go by we may expect good results. Judging also from their conversation and discussion after the meetings we may anticipate good practical results.

3. It is quite difficult to get the farmers to speak or prepare papers, as their command of the English language is not the best as yet, but in asking questions they took quite a prominent part.

4. The exhibit of farm products was fine, and was much more of a success than last year. After the last session Editor Brown, of the *Michigan Farmer*, had a picture of the exhibit taken, and a plate made therefrom, which was afterward published in the *Farmer*.

5. Not that I know of.

6. No. It is hard work unless we have outside talent to get the farmers together.

7. Advertising it thoroughly in local paper, which most of the farmers take.

8. About $10, for printing mostly.

9. Not being a practical farmer I am unable to properly answer this question; but would say that anything that is of interest and practical aid to farmers in the more settled districts of the State will be of interest to the farmers of this vicinity. They are interested in the Institute work and are in fact becoming more interested.

10. The impression of the Institute among our farmers was good, and they are anxiously waiting for the one next fall.

One of our farmers, who was much interested in the sessions, has already secured a cream separator, as a result of the Institute, and others are also becoming better farmers, especially in the manner in which they are improving in their butter-making, etc.

P. O'BRIEN, Iron River, Secy.

ISABELLA COUNTY—MT. PLEASANT: The attendance at our Institute was greater than ever before. Lively and animated discussions followed almost every topic especially those of greatest interest to the welfare and advancement of the farmer. Good feeling generally prevailed, and all seemed instinctively to understand their sole mission at the Institute was to edify and instruct and in turn receive instructions, fully realizing that all could not be specialists in the many branches of farm education.

The general effect of the papers read and discussions that followed will have an elevating effect upon the farming interests of the county, besides teaching them that they should look upon each other as friends striving for a common cause.

Little difficulty, if any, existed in securing local speakers. All topics were ably handled and exhaustively discussed, before passing to the next subject.

No farm productions were upon exhibition at the Institute. The farmers of this locality did not carry out the coöperative experiments suggested last spring, owing principally to the fact that they were published almost too late to be available.

We have not held any extra Institute meetings during the past year, but we have endeavored to hold a joint meeting of all the Farmers' Clubs of the county; but owing to the hurried season of August the meeting was not as well attended as we hoped it should be.

We have five papers printed in the county that take a lively interest in the success of our Institute and through the assistance of our Township Club organizations but little difficulty is experienced in securing a large attendance at each day's session. The Farmers' Institute has become a fixture in the minds of the farmers of the county, and all they generally desire to know is the day it begins.

The actual expense for advertising and running the Institute did not exceed $6, and this was for printing, programs, stationery and postage. In getting up a program we find it necessary to have as many portions of the county represented as possible, so that people who are interested in the work and qualified to write upon or discuss the subject assigned may be selected for this important duty. We have had good success in this line of work. Out of the three days of the Institute the first day and a half was occupied exclusively by home talent, and it was considered as interesting and instructive as any part of the work of the Institute.

The impression left upon the farmers of the county who attended the Institute was that the Institute was a complete success in almost every particular, and it is safe to conjecture, from the present manifestations of enthusiasm upon the part of the farmers of the county in work of this character that with an interesting program our Institute will continue to improve as it has done in the past.

M. E. KANE, Mt. Pleasant, Secy.

JACKSON COUNTY—BROOKLYN: Institute was not as well attended as it should have been, the attendance being composed of residents of Brooklyn village and members of Farmers' Clubs living mostly within a radius of five miles. Very few of the vice presidents attended or took any part in the work during the year, only nine townships being represented at the meeting. The common farmers living in the vicinity also were conspicuous by their absence. They seem to have a prejudice against the College and the professors and against the appropriation.

The enthusiasm of those who did attend as attested by the discussion of nearly every paper amply repaid all the trouble and cost of the Institute. I have never seen a farmer since the meeting who did not say he learned some one thing that paid him well for the time spent. To illustrate: One had been troubled with his butter not coming, and learned from Prof. Smith that potatoes would sometimes cause the trouble. By taking them out of the ration he cured the difficulty immediately.

We had no difficulty in securing local speakers, in fact I think there were many more who would have been glad to have told us what they know. We have had several local Institutes in Brooklyn and have always had a larger attendance than at our State meetings. Our county seems to be so thoroughly organized by Farmers' Clubs and Union Clubs that it is impossible to draw people a great distance.

Programs were sent to all vice-presidents and the county papers, and to many postoffices. All Farmers' Clubs had a special invitation to attend and join the society many weeks before; there was only one response and that was for information.

I am not satisfied with our present organization, as very few members ever join the second year, and the 10c annual fee will not begin to cover expenses. It would

seem from our past experience that future meetings in this county must be principally local in their character; that the meetings should never be held twice in the same locality until all the towns have been visited; and that the lectures and papers should be of local interest.

I would also suggest that the College advertise exhibits of products raised on the College farm, and see if they could not entice the old farmers to come and compete with them; also show new kinds of farm products.

If there is criticism of our program I think it would be that it was too intellectual for the common farmer who criticises book farming and is still sure that wheat turns to chess and planting in the moon governs yield of crops.

H. A. LADD, Brooklyn, Secy.

KALKASKA COUNTY—KALKASKA: A good number were present notwithstanding the cold, stormy day. Prof. F. S. Kedzie was our conductor and together with the president made things go. Our farmers thoroughly understand the importance of united action and all seemed ready and willing to lend their aid in every way possible.

Prof. Kedzie gave some valuable hints on Soils in which all were much interested. Hon. Wm. Ball's talks on Improved stock and Business Sense in Farming were well received, and the subjects thoroughly discussed. Many questions were asked and answered.

Mrs. M. A. Kennedy, on the Life We Live, gave a grand talk which was well seconded by local talent. The women's section was a decided success, we believe, in every particular.

A. P. Gray, on Small Fruit, and Apple Growing, brought out much valuable information and was well supported in the discussion which followed.

On the evening of the second day one of our teachers presented the Kindergarten, Its Exposition and Practical Application, a subject which is not well understood by all of our farmers, and created much interest.

Among our local speakers who presented papers were Miss K. Carpenter, Mrs. Clara Carlisle, Prof. E. L. Luther, A. A. Bleazly, and A. E. Palmer.

We believe our farmers are beginning to understand the value of Institute work, and, notwithstanding the great benefit derived from it at present, the Institutes in the near future shall be of vastly more benefit.

D. P. ROSENBERG, Kalkaska, Secy.

KENT COUNTY—GRAND RAPIDS: Our Institute was held in the circuit court room. The attendance was good, farmers, in some cases, driving twenty miles or more to attend. Lively discussions, taken part in by all, followed nearly every paper. Much interest and enthusiasm was shown.

We were very fortunate in getting good local speakers, who handled the assigned subjects well.

We had no exhibit of farm products. None of the coöperative experiments suggested last spring were carried on.

During the past year we have held no auxiliary meetings, but I would recommend that we hold three or four, perhaps, in different parts of the county before the Institute at Grand Rapids.

Our attendance at the meetings this year was not as large as last year when we had the "Round-up." We are hoping for it again, however.

Our entire expenses during the last year were about $35.50. Most of this was for printing and hall rent for the women's section.

The Institute was well advertised in all of the daily and county papers.

The women's section was well attended and much interest was shown. Mrs. Kennedy conducted the meeting with the best of satisfaction to all.

W. K. MUNSON, Grand Rapids, Secy.

LAKE COUNTY—CHASE: The attendance was good, about 125 at the opening session. The topics were well discussed, especially the remarks on silos and silage by A. E. Palmer, which were very interesting to the members of the Institute. Mr. J. N. Stearns gave us some fine ideas on fruit, cultivation, and care, which was followed by an enthusiastic discussion.

Essentials for successful farming in Northern Michigan, by A. E. Palmer, was very interesting and he gave us some very fine points on the dairy and its products.

Mr. A. A. Miner also gave us his experience and success with the dairy in Lake county which demonstrates that there is money in the dairy and stock business in our county.

Prof. F. S. Kedzie, on Keeping up Soil Fertility, with his illustrations, was appreciated, and fully demonstrated the necessity of fertilizing the soil in order to obtain profitable results.

The women's section was well attended; the church was filled and the ladies say they had a very interesting session.

I found it quite difficult to obtain local speakers as there are but few that want to lead out on a subject, but when some one leads they are good on discussions. We held two meetings during last summer, and they were well attended and all take an active part in topics and discussion, and the farmers have gone home with a good impression as to the working of the Institute. Those Institutes when held through the summer result in great benefit to the farmer in exchanging ideas on the growing crops.

J. G. ROGERS, Chase, Secy.

LAPEER COUNTY—LAPEER: 1. I think our last Institute was a success as to attendance and interest in the discussions.

2. The general effect of the Institute was good upon the farmers and farming interests in general. I think it had the effect to cheer and encourage them somewhat, which farmers are very much in need of at present.

3. No trouble to secure local speakers. The woods are full of them around Lapeer.

4. No.

5. Don't know of any.

6. No.

7. Advertising pretty freely in the local papers of the county, also sending out programs freely.

8. Postage, $3.00; printing, $5.75; music, $5.75; freight and cartage, $1.79; lighting house, $2.00; total, $18.29.

9. Think not.

10. I think the general impression was good. So far as I could learn the farmers were very well satisfied with the meeting and speakers. The meeting also developed some good local talent.

G. W. CARPENTER, Lapeer, Secy.

LENAWEE COUNTY—ADRIAN: The farmers of this county have learned to value the annual Institute, and arrange to attend with nearly the same regularity as they attend the county fair.

This Institute being managed by the county Agricultural Society the officers of the latter have to perform more gratuitous labor for the Society, and do not devote the amount of time to Institute work that is necessary.

The cost for printing was our only expense, about $10.

H. H. FERGUSON, Adrian, Secy.

LIVINGSTON COUNTY—HOWELL: The Institute was held in the large and commodious court house at Howell. The weather was as nearly perfect as could be, and everyone who came seemed in good spirits despite the cry of "hard times," which we heard so continually last fall. The room was crowded at every session and during the afternoon and evening sessions many had to be turned away as even standing room could not be obtained for them.

Livingston county is distinctly an agricultural county and her farmers are among the most progressive in the State. They maintained an Institute for many years previous to their organization under the State law. Every subject presented was ably discussed, both by State and local speakers. The utmost good feeling prevailed except in two instances. One local speaker (not a farmer) attempted to drag in purely local affairs when a paper on "Organization," by Robert Gibbons, was being discussed but was promptly declared out of order by the chairman and the storm was allayed. Again the discussion waxed warm when the question of asking the legislature for a continuance of the appropriation for Institute work was brought up. Personalities were indulged in by speakers on both sides, but cooler counsels prevailed and a motion to ask the legislature to withdraw State aid for Institute

work was defeated. Resolutions favoring an economical administration of public affairs, condemning the extravagant appropriations of the legislature of 1895, and protesting against any change in the present road laws were unanimously adopted. Like a violent thunderstorm which sometimes appears in a clear sky and quickly passes away again, leaving the sky serene and blue, so the heated discussion of the afternoon session passed away leaving everyone in good trim for the closing evening session, in which entire harmony and good feeling prevailed, and at its close all united in declaring it to be one of the most profitable and pleasant Institutes ever held here.

The program was carried out in full except in two instances, and one of these was only a five-minute talk on raising potatoes, under the direction of the experiment station. Owing to the exceedingly low price prevailing for potatoes undoubtedly the farmers were glad to dispense with the report of any experiment in any way calculated to increase the yield of this crop at present. The other was an address upon "Cranks," by one of the ministers of Howell, but owing to sickness the gentleman was unable to be present, but the discussion upon some of the other subjects was so prolonged that the time was fully occupied. Reporters for the local papers were present during the entire Institute and furnished their papers with lengthy and excellent reports of the proceedings.

F. J. FISHBECK, Howell, for the Secy., F. D. FILKINS, Oak Grove.

MACOMB COUNTY—ARMADA: The Institute was a decided success in all respects. The weather was favorable and the roads in fair condition, and a good attendance at every session can be reported.

The papers were listened to with great interest and every available moment was used in questioning the speakers and in discussions—in fact there was a somewhat general feeling that the program was too full. The effect of the meeting must be considerable, although the results cannot be accurately measured. Some of the dairymen are believed to be feeding more scientifically and the fruit growers are better prepared for the spring campaign than before the Institute, and there can be no doubt that those in attendance gained valuable information on many subjects as well as being brought more in touch with the College and its work.

Those who were asked to take part in the Institute by giving talks or reading papers were for the most part ready and willing to take the part assigned, and every person who was on the local program for a paper was prepared for their part.

A very small exhibit of agricultural products and dairy utensils was secured and added somewhat to the interest.

Two farmers in the neighborhood carried on the variety experiments in potatoes, made reports and exhibited samples of the various kinds.

This society has held no meetings except the annual Institute.

The county papers, of which we have a large number, were the principal means of advertisement used.

The copies of items for one week's issue of the papers were given a week in advance to the editor of the *Armada Graphic* who had them set up at once and made copies enough to give me one for each paper in the county. I believe that posters might have been used to advantage, but the papers alone gave good results.

The Institute cost the society about $18, of which $11 was for rent of church and hall, $5 for printing programs, and the balance mostly for postage.

The people of Armada arranged for a picnic dinner in one of the rooms rented by the society, and this was generally considered a great help to the Institute, as the farmers and their families came and did not go home to get dinner.

Two women were hired to assist so that the ladies who conducted the enterprise would not be debarred from the meetings.

The impression left by the Institute was very favorable, and the next one in this county will be looked forward to with great interest.

GEO. A. TRUE, Armada, Secy.

MANISTEE COUNTY—COPEMISH: The attendance at this Institute was good, considering that Copemish is located in the northeast corner of the county, but when the Institute opened there were about 40 that had came from 18 to 30 miles. The meetings were held in the Congregational church. And it was packed full.

The Women's Section was held in the Adams House, and was well attended. As a success the meeting was all that could be asked for. The discussions were entered into with zest, and the effect will be lasting.

There was some trouble in getting all the local speakers to take their parts assigned them, but others volunteered, so that it was all given.

The exhibit of farm products was very good, but not enough farmers took part in it. No farmers carried on any of the coöperative experiments.

In advertising, we put in the papers short sketches about the Institute and the programs, and mailed the programs to a great many all over the county. This, I think, is a very good way, as they take it as a personal invitation to attend.

The cost of the Institute was, for printing programs, $8.00; cards, $1.00; rent, for use of Institute, $5.50; postage, stationery, express on books, $4; total, $18.50.

It is a very good plan to have meetings once in a while; it generally cultivates an interest. I find that those that attend the meetings are the ones that take hold of the Institute. I think the Women's Section has the effect of drawing out a larger attendance of women. Our Institute was about evenly divided.

The State speakers gave the best of satisfaction.

The impression among the farmers as well as the people in Copemish was that the Institute was of a lasting benefit. And the people of Copemish gave the visiting people a royal welcome.

J. H. READ, Pomona, Secy.

MARQUETTE COUNTY—MARQUETTE: 1. Not a great success as regards attendance by farmers, but interest was shown by the Marquette people and the few farmers present. There was not much discussion.

2. The farmers present at the Institute were well interested; outside of this nothing can be said about the county.

3. No.

4. Yes; good success in the exhibit.

5. I don't know.

7. Our methods up here have to be different than in a farming community. The secretary should visit the farmers and let them know as I have done the last year and ask them to come there. Nine chances in ten they won't come. Our attendance at the Institute is nine of ten town's people.

8. About $18 was used for the expenses of printing, and music during the Institute and decorations of the hall.

9. We are thankful to the people of Marquette to help us in getting up a program, music and singing brings the people around to the Institute more than farming. Mrs. Mary A. Mayo was a help last fall.

10. I could not say; only the farmers present at the Institute were enthusiastic about it and want it to continue.

My suggestions are these, that it would be better to have our meetings where the farmers live and not in the town of Marquette. We can get up a program, and the farmers would be more at home and come.

LOUIS J. LAVOY, Harvey, Secy.

MASON COUNTY—SCOTTVILLE: The meeting was a better one than the year before in some features, though the part of the program furnished by the State was not as interesting to our farmers as at the previous meeting. The fruit interest, which is the principal feature of the farm in this county, was not as well and as attractively filled as before. The work done by Mr. Kellogg, the year before, added to that of Mr. Stearns, gave us much better fruit discussions the year before and drew out more new and material ideas. Upon the whole, however, the success of the occasion was manifest in the increased interest taken in the discussions. The general attendance averaged as well as the year before, but no better, owing to the fact that the settlement in which the meeting was held this time was smaller and more sparsely populated. A big meeting of fruit men and a much better program in an adjoining county also drew away many who would have otherwise attended.

The general effect of the meeting was to inspire in the minds of the attendants a determination to learn more of the best methods of culture. The farming of the county, it is safe to say, has been improved at least by ten per cent from the two meetings held here, and the interest has not yet become general by any means.

We had no trouble about securing local speakers on farm topics, but other parts of the program calculated to draw out a crowd were not well responded to.

We had no exhibit of farm products. At that time of the year it will be hard work to secure any decent exhibit, owing to cold weather and the general closing up of farm operations, many farmers by that time being engaged in logging or clearing land.

No experiments of any note were made such as suggested in the spring.

No meetings have been held since, but there has been some disposition manifested to hold monthly meetings during the winter months.

We advertised in the papers and sent out circulars or programs to different localities to be distributed by hand or through stores and places of resort in the farm settlements.

The cost of the meeting, I think, was not over $15, that being for printing and hall rent.

Meetings might be made much more successful if the officers took more interest in pushing things. The right kind of talent does not seem to have been employed here. Enthusiasm is a great power if we can find it and have with it business push and vim. Farmers generally are slow to take hold and do the work of arousing an interest.

W. J. MEISENHEIMER, Ludington, Secy.

MECOSTA COUNTY—MORLEY: 1. Attendance good, and can safely say discussions, interest and enthusiasm, etc., all good.

2. As far as I can learn the general effect was fine and think if we should ever have another meeting would have a larger crowd.

3. Did not have trouble in securing men to promise to take part, but some of them failed to put in an appearance at the time they were wanted, but think if had a little more time would have done better.

4. No.

5. No.

6. No.

7. Had notice put in all the county papers, also sent postals through the county and programs to vice-presidents to distribute.

8. Programs, $6; hall, $5; G. A. R. hall, so those who wished could carry their dinner and have it warm to eat, $2; and thnk a little something for church for Women's Section; $14 or $15 would cover the expenses.

9. Can't say that we have.

10. I think the general impression was very favorable.

MRS. C. H. LUDINGTON, Morley, Secy.

MENOMINEE COUNTY—STEPHENSON: The attendance was good at this Institute. No session had less than two hundred in attendance and some sessions as many as three hundred in attendance. The topics were well discussed, both by the State speakers and by local speakers. The interest was all that could be wished for, and everybody well pleased.

It was our third Institute, and there has been a growing interest, and increased attendance in each, since the first. The general effect upon the farmers and the farming of the county is to make the farmers more thrifty, more self respecting, and more intelligent.

We had no trouble in getting local speakers to take part in our Institute this year.

Our people commenced to prepare for this year's Institute as soon as the last year's Institute was over with. People were called upon and interviewed as to the part they would take in the next Institute, so that that part of farming that certain individuals are most interested in, and that they especially delight in was assigned to them, and they were on hand promptly. We are now preparing for the next Institute.

We make a specialty of our farm product exhibit, and find that to be a profitable part of our Institute. We award premiums, which consist simply of ribbons to designate the grade of the premium. We had a fine exhibit this year which furnished our farmers an opportunity to see which are the most valuable kinds to produce. It was enjoyed very much by all the farmers. Some of the farmers were to try the experiments suggested last spring, but I have not had reports from any of them. We have held some meetings at different farms in the county, which were enjoyed very much, and which seemed to be beneficial.

I am secretary of the Farmers' Northern Mutual Ins. Co., which does a large business among the farmers. We have posters printed and mail them to every member of the insurance company, and also to every member of the township Farmers' Clubs. We also publish it in the county papers. We find this plan of advertising works well, and brings the people out.

Our last Institute cost about $50, which sum was expended in advertising, buying feed for stock that was on exhibit, cleaning hall, etc.

Our methods of getting up program and interest are to constantly consult with farmers, and find out what they are lacking in, and to try to furnish them at the Institute just what they need.

The general impression among the farmers regarding the value of the Institute work is, that it is the one thing that they would not try to get along without. Our people say that they no longer feel that it is degrading to be a farmer, but that on the other hand, since they attended the Institute, they have learned that the best people and smartest people are farmers, that they love their farms, and love to work them, because they find more profit and more pleasure in it than they used to before learning many of the advanced ideas that they have obtained at the Institute.

NORWOOD BOWERS, Stephenson, Secy.

MIDLAND COUNTY—MIDLAND: Institute was held in court house; attendance, not large; average, about fifty. There was good interest and enthusiasm and prompt discussions on all topics, particularly potato growing and orchard fruits. For some reason the right interest has not been awakened among the farmers of this community as yet. Many of them when spoken to about attending, say it's no use as they are not able to go into book farming.

We have not held any extra meetings, but voted to hold our next annual meeting at La Port, a village in the oldest and best farming township in our county.

Advertising in the local papers has been our only method of securing attendance.

The cost of Institute meeting was $2.

The general impression among the city people is that the farmers of Midland county are missing a mighty good thing by not attending these Institute meetings.

FRANK H. OLMSTED, Midland, Secy.

MISSAUKEE COUNTY—LAKE CITY: The Institute can be called a success in more ways than one. The attendance was not as large as it should have been, but compared with the one held the previous year, made a good showing. The attendance was about double, the interest much better, discussions were participated in more generally by the attendants, and the people were more enthusiastic.

Our farmers who are attending these Institutes are taking more interest in their farms and their stock about them. We have had most trouble in securing local speakers of anything connected with the Institute work. Most of our farmers seem to think that they are not fitted to meet the expectations of those who are to hear them. Some refuse on account of timidity, while others lack interest.

We had no exhibit of farm products with the exception of what the president, Mr. Bartholomew, and Mr. Geo. Wallace brought in. No extra meetings have been held.

We have thoroughly advertised through the papers published in the county, also by sending posters to different parts of the county. I believe the advertising pays and will be the means yet of giving us large and well attended Institutes.

The cost was very nominal, not to exceed $2 to $2.50 per year. I don't think of any special features or methods for Institute work. The impression left is good and the sentiment is growing.

JAMES E. WRIGHT, Lake City, Secy.

MONROE COUNTY—MONROE: 1. The Institute, held in the court house, was one of the best in many ways ever held in the county, except in attendance which was rather light for our county. The program after the first session (in which we were disappointed in the attendance of one of our local speakers) was complete and well received and brought out a good full discussion and the time was well filled up.

2. All seemed pleased and well paid for attendance.

3. Our local speakers did well and kept their part of the Institute fully up.

4. The extremely cold weather of the week of the Institute not only kept many away but made our exhibit of many farm products out of the question.
5. Our time was so fully occupied with the program that there was most no time for presenting any of the coöperative experiments.
6. Our other Institutes at Maybee, June 25, 1896, and at London, January 14-15, 1897, were pronounced successes by all in attendance.
7. We have tried to mail programs to all members and publish them in season in all the county papers.
8. There were expenses of programs, $4; mailing and soliciting workers, about $1.50 for postage; opening and warming other rooms, expenses of speaker, piano for hall, etc., paid by citizens of Monroe, $11.30, making a total of from $17 to $18; but our membership has more than doubled the past year and we have twenty per cent more money now available for Institute work than ever before.
9. We solicit topics and questions from Farmers' Clubs and all members of Institute, and executive committee make up program.
10. Institutes are a good thing.

J. W. MORRIS, Monroe, Secy.

MONTCALM COUNTY—CARSON CITY: The Institute opened on time with a fair attendance. Much interest was shown in all the subjects presented. The discussions were general and at times animated. Gratiot, Clinton, and Ionia counties were represented. As the meeting progressed the attendance and interest increased, nearly four hundred being present the last day. Local speakers responded fairly well, and their subjects were well handled.

The exhibits were few but of high quality. It is to be regretted that no one in this locality carried on any of the coöperative experiments; extra meetings during the year would stimulate farmers to carry on these experiments.

The program was published in each of the county papers four weeks in advance of the meeting; the next weekly issue the personals of the first day's meeting, a week later the personals of second day, the last week a letter by the secretary stating the aims and objects, and extending an invitation to all.

The citizens of Carson City kindly furnished the rink opera house free of cost to the Institute society. The only cost to the society was printing programs, and small bills to circulate during the meeting, and postage and stationery.

The general impression left by the meeting was excellent. The Women's Section was well attended and all reported a splendid meeting. All the sessions were published in full in the *Carson City Gazette*, in a very complimentary manner.

GEO. H. LESTER, Carson City, Secy.

MUSKEGON COUNTY—MUSKEGON: The attendance was immense, standing room being at a premium. Discussions were largely taken part in by the farmers with great interest. Enthusiasm ran high. The effect of the Institute was to bring out buried thoughts and ideas from farmers and others which were of great value to the people and a general good will be the result to the farmers of Muskegon county.

There was no trouble in securing local talent to prepare papers, write essays, recite or lead in discussion. Occasionally a failure will occur under favorable circumstances. There was no exhibit of farm produce or fruit. Our farmers did not try any of the coöperative experiments suggested by the superintendent.

We held a summer meeting of the society at the park on August 14. It was a success so far as attendance was concerned, but as to actual good and benefit to the farmer is concerned it was a flat failure.

In advertising our Institute we consider the best plan is to get a sufficient number of dodgers and have our county superintendent of schools send to each school teacher in the county a sufficient number and by her or him sent by the children to each and every home in the district or village. I think this method of advertising was very successful in securing so large an attendance.

The cost of our Institute was about $12; $6.50 for printing, $2 for labor and necessaries for dinner, and $4 for piano.

I believe it needless to offer any suggestion to the superintendent as to methods of Institute work. The farmers of Muskegon county are greatly impressed with the good management, and the great value derived from the State Farmers' Institute meetings.

C. E. WHITNEY, Muskegon Heights, Secy.

NEWAYGO COUNTY—FREMONT: The Institute was a complete success, both in attendance and interest. The discussions were lively and to the point. The State speakers were plied with many questions, to all of which they gave satisfactory answers. The general effect of the meeting on those in attendance was good, and everyone went home well pleased with the meeting. Two of our local speakers were unable to be with us, but one sent his paper.

We made no exhibit of farm products but shall try to next year.

We use our local papers freely to advertise our meeting, and print plenty of programs, and send out to the farmers of the county. This seemed to be very successful in getting a good attendance.

The cost of our meeting for postage, printing, stationery, and hall rent was about $10.

We have no special methods in getting up programs or carrying on our meeting, but everything seemed to work to the success of the meeting.

The general impression among those in attendance seemed to be that the Institute work as carried on now is a grand thing for the farmers, and all seemed anxious to have another one next winter.

W. C. STUART, Fremont, Secy.

OAKLAND COUNTY—MILFORD: 1. Attendance was good, being an average of 470 per session. Discussions were animated, bringing out many good points. Was intense interest almost from start to finish. Enthusiasm, after fairly under way, was all that could be asked for.

2. The general effect of the meeting upon the farmers and farming of the county will be greatly beneficial. The standard has been lifted to a higher level.

3. We had some difficulty in securing speakers from townships other than those adjacent to Milford, but when speakers were secured they took part gladly, when possible to come, and all but very few came.

4. We had no exhibit of farm products except in some of the hall decorations.

5. No; not that I am aware of.

6. None were held, I believe.

7. We have thirteen county papers and to each was sent a notice of date of Institute with request that they publish same. The seven or eight farmers' clubs in this and adjoining townships were excellent mediums of advertising and one of our committee or some member of the club, known to be in earnest about the Institute, was present at the club meeting to thoroughly arouse interest in the coming Institute. Our committees have talked Institute to everyone for six weeks before the time. We also used the notes sent by you.

8. The cost was $25 or thereabouts, divided as follows: Hall rent, $10; advertising, $5, including programs; postage, $5; other incidentals, $5.50.

9. The whole work was placed in the hands of a program committee of three and an executive committee of three, to solicit funds and arrange for hall, etc. We secured from all parts of the county possible parties to give papers and take part in discussions, and in the same manner secured all the talent we could for music, recitations, songs, poems, etc., to add interest, variety and life to the exercises. Variety is the spice of life. An Institute need not be dry and ours was a lively one.

10. The value of the Institute work, I think, is appreciated by the majority of our farmers, especially those present. The wisdom of a large appropriation is questioned by most of them, especially in these hard times. They think the same work could be accomplished by local expense entirely. Some fear that they could not be as successful without both State aid and local help. The benefits of the system are not questioned, but the burden of taxation rests heavily on the farmer that must be lightened if he is to be a free man.

F. N. CLARK, Milford, Secy.

OCEANA COUNTY—SHELBY: The long fruit Institute held at Shelby this winter was a pronounced success in every way, except that the attendance was not what the excellence of the program seemed to warrant and the advertising done should have procured. The attendance increased, however, with each session, and the interest and enthusiasm of those who were present was marked. Such an excellent school could not help being of great benefit to the farming interests generally. Local speakers occupied no time during the day sessions, but the evening sessions were made up from local talent entirely. An excellent exhibit of farm products was one

of the most interesting features of the meeting. Our Institute was extensively advertised through the county papers, by posters and postal cards sent to nearly every freeholder in the county as well as by personal solicitation by officers, speakers and all those interested. As a whole there was an increased interest in Institute work as a result of the last meeting.

W. N. SAYLES, Hart, Secy.

OGEMAW COUNTY—ROSE CITY: 1. On account of the condition of the roads our attendance was smaller than last year. Our discussions were fair; considerable interest and enthusiasm were shown.

2. The general effect of the meeting was good. I have heard it very favorably commented upon by the farmers who were present.

3. Yes, it was almost impossible to get local speakers, but I do not think that I will have that trouble again.

4. Yes, but not large. The samples we did have were very nice. I think next year I can make a success of the display.

5. No.

6. Nothing except the picnic, which we held in September.

7. I followed the plan you suggested, as near as I could, with fair success.

8. The cost was very nominal, only what I paid for oil and wood and a small sum for janitor service.

9. Do not know that I have.

10. The general impression was very good, and if nothing happens I think we shall have a rouser next year.

H. S. KARCHER, Rose City, Secy.

OSCEOLA COUNTY—HERSEY: The Institute was held in the court house and was a successful and profitable meeting. Attendance, however, was not as large as it should have been. Our village was just relaxing a vigilant quarantine for diphtheria. Average during day sessions, which are here the main sessions for the farmers, was about ninety. We did not attempt a lengthy program, having but two subjects each session, but these completely filled the time.

We have had several Institutes in our vicinity before, and our farmers have learned to "take hold" of such things. Discussion was general and pointed. We needed no question box, as questions were fired at the speakers at every opportunity. People who came to criticize remained to praise.

The knowledge brought us by men eminent in their callings, and the practical, straight from the shoulder, talk given us by Mr. Palmer, *can't help* having some influence for the betterment of farmers and farms.

The secretary is pleased to say that in no instance did a local farmer who was asked to prepare a paper refuse, neither did any fail to fulfill their promise. We had a small but very nice exhibit of fruit, and the newer varieties of potatoes. This feature ought to be increased twenty-fold.

The cost of our meeting was about $6.50, spent entirely for the printing and mailing of programs and handbills. Our printing was done at rock-bottom figures by our local printer. All the county papers publish any Institute matter sent for notice in their papers without charge.

One feature which I think of advantage in stirring up interest all over the county is in getting the prominent farmers from other points than the one where the Institute is held to furnish the papers and talks assigned to county talent. It certainly worked well here. Our attendance, while not very large, was fairly representative of the whole county. Our farmers, one and all, say, Come again!

WILL RICHARDS, Hersey, Secy.

OSCODA COUNTY—MIO: The Institute, while not receiving the attendance it deserved at the hands of farmers, yet an earnestness in the various topics discussed was manifested that can not fail of much good. Discussions were entered into freely and drew forth the best experience from our most progressive farmers. The effect of these Institutes upon the occupation of farming, and upon the farmer cannot fail, with the excellent corps of State speakers, versed as they are in the finest science of the farmer's vocation, and combined with the every day practical farmer's experience, of being both highly instructive to the average farmer, as well

as infusing into the minds of the younger class of the farming community a more ennobling conception of the farmer's vocation.

One of the great troubles of these Institutes where they are of recent growth is to get our farmers to either speak or write at our meetings. This we can safely say is through diffidence, more than from lack of ability. A continuation of the work will, in a measure at least, obviate this. Our exhibit of farm products was very limited, but excellent in quality.

Our farmers have held no extra meetings during the year, and so far we have simply advertised the Institute by local jottings in county papers, and personal letters to members, and to others whom we feel might take an interest in the work.

The cost of our Institute is light, it being but a trifle over $6 for the whole year. Our farmers generally feel that these Institutes are and can be made highly beneficial to them. Oscoda county is just emerging from a lumbering to a farming district, and no time could be more beneficially chosen than the present for planting the seeds of intelligent farming; and in no way can it be better done than by a continuation of the Farmers' Institute work.

ROBT. KITTLE, Biggs, Secy.

OTSEGO COUNTY—GAYLORD: This meeting was very pleasant and profitable. The remark was frequently heard, "This is first rate, better than last year." While some doubted this last statement, all feel that the State is justified in holding these Institutes. There was a fair attendance of ladies at the various sessions, and when Mrs. Mayo brought her forces from a separate meeting, they filled the room. The general discussion, coming from a class of men not specially trained in that line, was earnest, fair-minded, and enthusiastic.

A few farmers will go home and act upon the suggestions given in regard to grasses, silos, saving liquid manures, and balanced rations, and possibly in regard to what are best varieties of apples and berries to plant in order to have a well-balanced succession of fruits.

Scores of farmers who ought to have been there, were absent. Some people are always indifferent to measures put forth in a public-spirited way for their benefit.

There is many a farmer in this county who would receive new inspiration and enough ideas, and stimulus to his pluck to go on to success on his farm, instead of letting go, as he is almost ready to do.

Our greatest trouble with local speakers is, that they promise to take part and then fail to do so.

We had no exhibit of farm products. I think that the ideal Institute would include such, of all kinds.

As far as I can learn, no farmers carried on any coöperative experiments. I think much good would accrue to all farmers doing this and exchanging ideas.

The interest, when we do not have the State speakers with us, hardly makes it possible to hold profitable extra meetings. There ought to be interest enough among farmers to warrant holding meetings quarterly, to discuss plans for each season in advance.

We advertised the meeting thoroughly through the two county papers, by personal notice and by hundreds of circulars. We had some circulars distributed at school-houses, having the children take them home.

The cost of the meeting:—

1,000 programs	$6 00
Dray for organ	50
Postage	1 17
Total	$7 67

I believe that the grasses shown by Dr. Beal were of great interest. The people understand the thing itself rather than an explanation of what they can't see. To this end, it is well to use stereopticons, butter making utensils, models of barns, etc. etc.

All agree that this Institute work, if intelligently planned and kept up right along, will gradually educate our rural classes up to better standards than those they now follow, notwithstanding the fact that some one will grunt out, "Them College fellers that farm by books and papers can't teach me nothing."

R. D. BAILEY, for J. B. SCOTT, Gaylord, Secy.

OTTAWA COUNTY—HOLLAND: The meetings were held in the Y. M. C. A. rooms, which proved rather small for the purpose, the attendance being much larger than had been anticipated. This being the first Institute held in the county under the auspices of the State Board of Agriculture, our plans for the work were necessarily somewhat experimental. Considering this fact, as also the additional fact that many of our farmers have a decided prejudice against what they consider "book farming," our first Institute was a decided success. The attendance at all six sessions averaged considerably over one hundred; the highest attendance at any one session being 140, not including the Women's Section.

In point of interest and enthusiasm there was nothing left to be desired. The most careful attention was given to all the speakers, local as well as State, many following the talks with note-book in hand. The discussions were lively and to the point, the only difficulty being to confine them within the allotted time. The question box was worked to its full capacity, and was one of the best appreciated parts of the program.

As to the effect of the Institute. If one can judge by interested, absorbed faces, persistent attendance, and active participation, the Institute has had a great influence for good, especially in stimulating to better and more advanced methods of farming. One result it has certainly had and that is to remove prejudice against the kind of "book farming" which is taught and practiced at our Agricultural College. The farmers already look forward with pleasure and interest to the next Institute.

Modesty was the main difficulty in the way of securing local speakers, but by persistent work we congratulate ourselves upon getting good practical speakers who had something to talk about. Mr. Van Hees's paper on "Potatoes," Mr. Yntema's on "Hogs on the Farm," Mr. Howell's on "Leaks," Mr. Avery's on "Jerseys," Mr. Souter's on "Good Roads," Mr. Post's and Mr. Latta's on "Forestry," and Mrs. Howell's on "The Farmer's Wife," were all good practical papers, full of valuable information.

The only exhibit of farm products was a small but good display of apples made by Mr. Geo. H. Souter.

No coöperative experiments were carried, so far as I know.

No extra meetings have yet been held, though some are talked of for the future.

In advertising the Institute all possible use was made of the county newspapers. Notices of the meeting were sent to all the papers as early as possible, with reading items for local columns, containing always the place and date. Later completed program was sent, with request that it be published in full, and with further reading notices to keep the matter constantly before the public. Bundles of programs were sent to all the vice presidents for distribution and to several school houses in localities where there was no vice president. Copies of program were left in stores on the Saturday preceding the meeting, to be handed to farmers. Letters and postal cards were also used to some extent.

Expenses:—

Rent of rooms	$6 00
Rent of chairs	3 00
Programs (1,000)	4 50
Postage, etc., (about)	1 50
Total	$15 00

No special attractions were given, except that for afternoon and evening sessions we secured some excellent music, and a fine humorous reading by Prof. Bergen of Hope College. There was nothing else of special interest, aside from the regular program.

The general impression made by the Institute upon the farmers, is, I believe, that the work is a grand one, stimulating and helpful in every way. One could not look into those interested faces without seeing that the Institute was thoroughly appreciated.

One feature of our Institute is perhaps worthy of mention—the large proportion of young men between twenty and forty years of age who were present.

CHARLES S. DUTTON, Holland, Secy.

ROSCOMMON COUNTY—ROSCOMMON: The first difficulty met with was that of getting a paid-up membership large enough to get the State officers and lecturers to come here. As the local society has control of its own funds and is compelled to stand the local expenses, the secretary, after several ineffectual attempts to secure

them, reported a paid-up membership of twenty in order to be able to hold a meeting, and in hopes that there would be enthusiasm enough aroused to put the society on a stable foundation. But while a goodly percentage of the actual farmers turned out and heard the lectures as given by the State speakers, and seemed to enjoy it, they seem to be in the same mood as before as far as doing anything toward another meeting is concerned.

The principal drawbacks in this county are, poor roads, sparsely-settled country, and the fact that we have as yet a very few men who depend upon farming solely for support. Therefore they generally have a long way to come and their interests being somewhat diversified they do not take the interest that would be taken in a solely farming community. I think, however, that the general effect upon the few farmers who attended was good and if we can manage to keep up the meetings, in time we will have a flourishing Farmers' Institute in this county.

It is almost impossible as yet to get local speakers to work up a subject in a way to give practical benefit. But as we have had a large increase in our farming population, drawn mostly from farming districts in this and other states during the past year, I am in hopes that this difficulty will be avoided somewhat in the future.

There were a few exhibits of farm produce which I think would compare favorably with those of any farming district in the State.

The cost of the last meeting was donated by different parties in the community.

I think that the features that should be worked most in this locality at Institutes are grazing and stock-raising. This section of the country seems to be especially adapted to these pursuits and we already have several prominent men taking them up.

We have in this county about 335,000 acres of land, fully one-half of which is good enough to raise any crop that can be raised in this latitude. The balance is the very best of grazing land. Our winters are becoming so mild that cattle run a good portion of them. In the county are three fine lakes and three rivers besides numerous small streams which furnish abundant watering facilities. The land adjacent to these lakes and streams is the best. Land is abundant and to be had almost for the asking and all we require is a little time and some settlers to enable us to present you with as good an Institute report as any county in the State.

W. F. JOHNSTON, Roscommon, Secy.

SAGINAW COUNTY—CHESANING: The Institute was held in the opera house, and was pronounced the best attended and most profitable ever held in Saginaw county. There was an increased attendance from the first session to the last, also an increased interest. A marked feature of the meeting was the perfect freedom with which each subject was discussed, thus keeping up the interest and making all feel at home. There is no doubt that much good will result from the work done in this Institute. The subjects were all good and were well received. Space will not admit mention of each. The value of the Institutes to farmers can hardly be estimated. The only regrets are that all in the county could not have improved the opportunity.

The exercises were interspersed with appropriate music furnished by Chesaning's best singers, under supervision of Prof. Chas. Bennett.

Last, but not least, was the Women's Section at the M. E. church, which was filled with an audience of bright, intelligent women and girls, on Saturday afternoon, to listen to Mrs. Mary A. Mayo. She gave two addresses, "Making Housework Easier" and "Mother and Daughter." Both were replete with beautiful admonitions to mothers and daughters.

JAS. A. SLOCUM, Saginaw, W. S., Secy.

SANILAC COUNTY—CROSWELL: The three days' county round-up Farmers' Institute at Croswell was a decided success. The meetings were very large and the program very interesting; all the more so as everyone took a lively interest in each topic and let loose their thoughts upon the subject as soon as each speaker finished and discussed it thoroughly pro and con, and in this way received not only the benefits of the speakers' experience and work but what their neighbors had tried in the particular line and their success or failure. The Institute was an educating medium to all in attendance—the farmer and the farmer's wife, their sons and daughters, all received ideas which they can work out to their peculiar benefit and to the comfort and improvement of their homes and farms. Each listener could pick out something in what was said to help him in his work on the farm if he would strike the right strain and labor hard enough to carry it through. Each

speaker told what he knew of his subject from an experience which he had secured from hard work, which was not always a success, for adversity is the best of teachers, and they profited in knowledge from failures in their lines and improved. His views were not such as would suit every person and they could not be applied to every locality, and in this the discussion brought out fresh items of interest. It was made evident that the thriving farmer has to do as much head work and as much foresight as the average business man who is also successful.

The attendance throughout was very large, the smallest being about 350 and the largest over 600. The financial report as to receipts and expenditures was as follows:

Received in membership fees		$14 25
Paid for hall	$10 00	
Paid printing programs	3 00	
Paid extra chairs for hall	1 25	
	$14 25	

Mr. Morrill said, in closing the Institute, that he had been attending Institutes for twenty-one years and never had heard better music than that at Croswell.

JOHN ROBB, Crosswell, for E. M. DENTON, Sanilac Centre, Secy.

SHIAWASSEE COUNTY—LAINGSBURG: The attendance for most of the sessions was all the capacity the hall could permit. The weather was quite unfavorable—especially the first day. The first session closed with about one hundred farmers present. Subsequent sessions had over three hundred present and more turned away. Shiawassee county has had a society for many years, and a great deal of interest has usually been manifest.

The general effect upon the farmers present was most favorable, and nearly all went away determined to farm better another year. We have no trouble to secure local speakers. The greatest trouble seems to be to get those who will present a practical, attractive article, limited to the allotted time.

Shiawassee county has seven live farmers' clubs, and these to quite an extent take the place of extra Institutes.

The only way we find it necessary to advertise is to keep short notices of the Institute in the county papers from the time the date of the Institute is fixed until about two weeks before the society convenes, when the program in full is published.

Our expenses are light. The hall is furnished. The programs, music, stationery, stamps and the few other expenses come, this year, to $6.50.

We aim to have two good papers, neither over twenty minutes long, with abundance of time for discussion for each day session. The evenings are given up more to music, recitations, and papers not intended for discussion. This gives more variety. We always want a live man in charge of the question box. Where some "dead head" takes too much time in the discussions and injures the meeting the committee quietly and very carefully inform him to be spry and brief.

The interest in Institute work in this county is growing and the farmers are coming to depend more and more on the Institute as a practical instructor.

CHARLES B. COOK, Owosso, Secy.

ST. CLAIR COUNTY—EMMET: 1. The attendance was very large from start to finish. All the subjects were discussed, with much interest and enthusiasm.

2. The effect upon the farmers was, or appeared to be, good, and I think will create much interest in the line of farming.

3. Had considerable trouble in securing local talent, but when secured, it was first class and all who consented to take a part came up to the work admirably.

4. Did not have exhibit of farm products. No room for it.

5. No farmers have reported success or non-success in the coöperative experiments suggested by you, so I conclude none were tried. In fact they came rather late.

6. Have held no extra meetings the past year.

7. We simply advertised our Institute by sending a copy of our program to each paper in the county and it was published by the most of them. Also mailed programs profusely to all parts of the county. Well satisfied with result.

8. The cost of our Institute to the society was $12.71. For programs, $4.75; postage, $2.50; expenses of the secretary and president, $5.46. The hall was donated by Daniel Foley.

9. I have no particular method to suggest regarding Institute work, only constant and zealous work on the part of officers and committees.

10. Judging from what I saw, the impression made upon farmers regarding the value of the Institute was very good.

MOSES F. CARLETON, Pt. Huron, Secy.

ST. JOSEPH COUNTY—THREE RIVERS: The Institute was pronounced by all a grand success, and it does one good to hear not only farmers but business men speak of it as a splendid educator in advancing social as well as farming interests all along the line.

Farmers would come to me during the meeting and exclaim, "Why, I didn't realize it was such an educator, or I wouldn't have missed a session," etc.; and the business men said they would gladly pay all expenses to secure the Institute next year, for the evening programs alone. The attendance, though not large the first session (it being the first Institute ever held here), rapidly increased in numbers as the true worth of the work became known, the hall being packed the third session and many turned away for want of seating room.

The discussions were intensely interesting and of a nature to fit the present needs of the county admirably, carrying good fellowship and a thorough understanding throughout. The only regret our people express is that it could not be a week instead of two days.

Our local speakers were interested through the last year's report and made to feel at home by explaining the social part of the Institute work as a home coming or family reunion of the farming fraternity to relate experiences and counsel one another on the work to be done the coming year.

The subjects were presented in a way that interested all whether engaged in that line of farming or not, and the speakers were highly complimented on each occasion.

The effect of the Institute on this community has been to open up new channels and new methods, revise old rules, connect the mind more directly with muscle and institute a firm determination to keep pace with the advance line in the common sense principles of agriculture.

I regret to say it was impossible to secure at that time of year without any previous arrangements an exhibit of farm products to be of any practical value to the Institute, for I believe it to be a feature that is well worthy a goodly effort on the part of all, bringing as it does nature's final testimony.

The meeting was advertised by means of a few news items in the local papers three or four weeks previous; two half-column articles in each county paper, setting forth the objects, speakers, etc., and a warm invitation for all to attend, 400 large posters ($2.00) distributed to vice presidents to post in public places, 2,000 programs ($7.00) 800 of which, together with 500 special programs for the Women's Section (paid for by neat and attractive advertising therewith), were also sent to vice presidents with request to interest every farmer if possible.

As the Farmers' Institute was a stranger here the different ladies' clubs were interested in the Women's Section and generously entered into the work of making out a fine program interspersed with choice music that took Mrs. Mayo by surprise. The hall was beautifully decorated by the ladies and though large it was packed to the doors by an appreciative audience, while many more were unable to gain admittance. To the ladies we owe this grand success.

Should the Farmers' Institute wish to come to Three Rivers in the future I could promptly reply in behalf of its people and the farmers who attended our meeting: Come! You are thrice welcome!

DISON J. PORTER, Three Rivers, Secy.

TUSCOLA COUNTY—VASSAR: There was a very good attendance at every session, although it was somewhat larger toward the last, while the spirited discussions were made very entertaining by the lively interest taken by all.

Undoubtedly a great many farmers were benefited by what they learned at the Institute, besides being given an opportunity for expressing their thoughts in public. The local talent willingly took part, and rendered some very good selections.

We have had no exhibitions of farm products on account of the want of room; neither have any of the coöperative experiments been tried as yet, nor have any extra sessions been held.

The cost of the last meeting was about $25, in parts as follows:—Hall rent, $15; printing programs, $5; postage, etc., $5. All advertising was done by the local papers, gratis.

We have no special features, yet nearly everybody was well impressed with the Institute.

FRED H. ORR, Caro, Secy.

WASHTENAW COUNTY—CHELSEA: As a whole the meeting was a complete success, although the attendance was not as large as it ought to have been and was almost entirely local, yet the interest never lagged. Discussions were lively, well taken and usually to the point. Enthusiasm was great from beginning to finish and at the close many were heard to remark, "We will have an Institute of our own next winter."

2. The effect was marked and left an incentive to strive more in the future. While those in attendance were all representative farmers, there were statements made "that those that needed the Institute most were conspicuous by their absence."

3. We had no trouble in securing local speakers, although some did not materialize. Yet those who did acquitted themselves nobly, for anything of a like nature never was a failure in this county.

4. We had no exhibit of farm products in connection with the Institute.

5. Neither were there any of the farmers who cared to carry on any of the experiments as suggested last spring.

6. Have held no extra meetings during the year as Institute meetings although have had many farmers' picnics, both local and public, at which farm topics and others of general interest have been discussed.

7. In advertising we have notices published in all of the county papers, also post programs in all of the postoffices in the county. Some think that posters would be the better way, but it is not that people do not know that they do not attend, but because they will not, for when asked, the answer is: "Well, I couldn't," or "What good will it do?"

8. The cost of our last meeting was about $22 for rent of hall, printing and traveling expenses of secretary, he living 32 miles distant from place of meeting.

9. We have no special method or manner in the work of the Institute or of getting up of programs. I call the executive committee, if there are topics aside from the program furnished by the State that we think would be of interest, we give to some good man or woman, appoint leaders in discussion, and if the people will only come to the meetings they will be interested, I'll warrant.

10. As regards the Institute work in general some think that it is of great value and very instructive, others think it does not warrant the expense.

H. STUMPENHUSEN, Rawsonville, Secy.

WAYNE COUNTY—PLYMOUTH: The Institute was a splendid success, not only in point of attendance but in quality of work done and the earnest interest shown.

Those to whom papers were assigned cheerfully responded without exception and in a manner which showed they had carefully and thoughtfully prepared themselves. The discussions were full of life, earnestness, and were productive of thought. The questions were many and to the point. The keen interest shown at the beginning, and even before the meeting, increased throughout the two days and ended in enthusiastic praise from all sides.

The State speakers showed themselves equal to the occasion, each handling his or her subject with that skill which commands attention and starts independent thought in the minds of the listeners.

So interested and enthusiastic did the audience become at times that they began asking questions of the speaker in the midst of his talk.

I am sure the Institute gave farmers new ideas, broader views, and will make many of them more careful fruit raisers, soil tillers, and fertilizers; and it should, and I think will, raise many of them to a higher, broader, nobler view of life in general and farm life in particular, for it is difficult to believe that people could listen to the talks given by Mrs. Mayo and Mr. Shawner and not be thus affected.

We held no extra meetings during the year, and made no exhibits at our Institute, except that Mr. Geo. A. Wells of Flat Rock, took up under the coöperative experiments, the potato experiment, using ten varieties of seed sent from the Agricultural College, and exhibiting some of the potatoes grown.

We advertised our Institute by sending short Institute articles, items and notes or readers to the several papers of the county during the few weeks before the Institute, which they kindly published; urged each vice president to keep the subject well agitated in his township; had a large number of programs printed and sent from 25 to 50 to each vice president to distribute about a week before the meeting. Secretary sent many by mail to different persons throughout the county; had about five large bills to each township posted in conspicuous places therein and a program posted beside it; had programs printed in all the papers of the county. Results very satisfactory.

Institute cost something over $35, as follows:—Printing, $14.35; music, $7; hall, heated, lighted and janitor service, $5; chairs and incidentals, $2.50.

All seem to feel that Farmers' Institutes are doing a good work, and are of great value to agricultural interests.

J. H. HANFORD, Plymouth, Secy.

WEXFORD COUNTY—SHERMAN: The Institute was thoroughly wide-awake and a decided success. The speakers furnished by the State were well received and a hearty coöperation on the part of the members was everywhere apparent. Local speakers were generally prompt and their subjects were very well prepared. The discussions were also prompt, enthusiastic, and proved to be a great source of practical benefit in drawing out new ideas. Every session was well attended, and the people were thoroughly awake to their individual duty in helping to make the Institute a success, and it is not too much to say that the better methods of farming there brought out will be largely practiced hereafter.

We had no trouble in securing local speakers,—they were on deck for business. The coöperative experiments were not as thoroughly carried out last year as they should have been, but the plan was new; however, I believe there would be no trouble in making it a success next year. No extra meetings were held during the year but a farmers' club has been organized in Sherman as a result of the last Institute, which will be a success, and it is hoped that others will be organized in various localities through the county this winter.

Our methods of advertising are through all the newspapers in the county, in the local columns, beginning several weeks before the Institute, calling attention to the general and special features and urging a full attendance; then about two weeks before the session, print programs and send a sufficient number to the vice presidents for distribution, and also enlist the services of merchants in distributing to their patrons. In this way it is thoroughly advertised throughout the county. In filling the programs furnished by the superintendent of Institutes we endeavor to select topics of local importance and then select local speakers according to adaptability.

The people of Wexford county have had a taste of Farmers' Institutes and they feel that a deprivation of them now would be little less than a calamity.

ELWOOD PECK, Cadillac, Secy.

LAW AND RULES GOVERNING MICHIGAN FARMERS' INSTITUTES

JULY 1, 1895, TO JUNE 30, 1897.

THE LAW GOVERNING FARMERS' INSTITUTES.

[Act No. 166 of the Public Acts of 1895.]

AN ACT to authorize the State Board of Agriculture to hold Institutes and to establish courses of reading and lectures for the instruction of citizens of this State in the various branches of agriculture, and making an appropriation therefor.

SECTION 1. *The People of the State of Michigan enact,* That the State Board of Agriculture is hereby authorized to hold Institutes and to maintain courses of reading and lectures for the instruction of citizens of this State in the various branches of agriculture and kindred sciences. The said Board shall formulate such rules and regulations as it shall deem proper to carry on the work contemplated in this act, and may employ an agent or agents to perform such duties in connection therewith as it shall deem best.

SEC. 2. When twenty or more persons, residents of any county in this State, organize themselves into a society to be called the ———— County Farmers' Institute Society, for the purpose of teaching better methods of farming, stock raising, fruit culture, and all the branches of business connected with the industry of agriculture, and adopt a constitution and by-laws agreeable to rules and regulations furnished by the State Board of Agriculture; and when such society shall have elected such proper officers and performed such other acts as may be required by the rules of said Board, such society shall be deemed an Institute society in the meaning of this act: *Provided,* That not more than one such Institute society in any county shall be authorized by this act: *And provided further,* That any existing organization, approved by the Board of Agriculture, shall be considered a legally organized Institute society under the terms of this act.

SEC. 3. In each county where an Institute Society shall be organized under the provisions of this act the State Board of Agriculture shall hold one annual Institute, two days in length, at such place in the county and at such time as said Board may deem expedient, and shall furnish at least two speakers or lecturers, with all expenses paid, to be present at all sessions of the Institute. The County Institute Society shall provide a suitable hall for the Institute, furnish fuel and lights, and pay other local expenses, and shall provide speakers who shall occupy one-half the time of the Institute that is given to set addresses: *Provided,* That upon the request of any local Institute Society who desire to conduct their own Institute, the State Board of Agriculture may, in their discretion, appropriate from the Institute fund money not to exceed twenty-five dollars in lieu of the speakers provided for by this act, said money to be expended by said local Institute Society entirely in Institute work.

SEC. 4. If the funds appropriated by this act will permit, the said Board of Agriculture may hold a number of four-day Institutes, at such places and times as said

Board may determine, at which the primary object shall be to furnish a school of instruction in practical agriculture and kindred sciences.

SEC. 5. The State Board of Agriculture shall maintain the course of reading known as the Farm Home Reading Circle, and may expend from the moneys appropriated by this act a sum not to exceed two hundred dollars for each of the two years for which the appropriation is made, for the maintenance and extension of said course.

SEC. 6. For the purposes mentioned in the preceding sections the said Board of Agriculture may use such sum as it shall deem proper, not exceeding the sum of five thousand dollars in the year ending June thirtieth, eighteen hundred ninety-six, and five thousand dollars in the year ending June thirtieth, eighteen hundred ninety-seven, and such amounts are hereby appropriated from the general funds of this State, which said sum of five thousand dollars shall, for each of the years eighteen hundred ninety-five and eighteen hundred ninety-six, be included in the State taxes apportioned by the Auditor General on all the taxable property of the State, to be levied, assessed and collected as are other State taxes, and when so assessed and collected to be paid into the general fund to reimburse said fund for the appropriations made by this act.

This act is ordered to take immediate effect.

Approved May 18, 1895.

RULES OF THE BOARD OF AGRICULTURE GOVERNING THE MANAGEMENT OF FARMERS' INSTITUTES; UNDER ACT NO. 166 OF THE SESSION OF 1895, APPROVED BY THE GOVERNOR MAY 18, 1895.

1. The immediate management of Farmers' Institutes is placed in charge of the Superintendent of Institutes, under the direction and control of the Board of Agriculture. The Superintendent shall arrange for locating and holding Institutes under the act making appropriation therefor. He shall approve of Institute Societies authorized by law, when properly organized. After consultation with the officers of the county Institute Societies, he shall determine the time and place of holding each Institute and the subjects to be discussed, having reference in these to the branches of agriculture most prominent in the locality and the wishes of the society. He shall designate the persons to attend the Institutes as lecturers, and shall make such other arrangements as in his judgment may be necessary for the proper conduct of Institutes. He shall have authority to meet with the county Institute Societies to make arrangements for Institutes. He shall have authority to reject from the program local speakers or topics.

2. The Superintendent may call upon the faculty and instructors of the College and members of the Experiment Station force for such an amount of Institute work as may be assigned them by the Board. He may, with the approval of the Board, employ such other lecturers as may be needed for the conduct of Institutes. He shall arrange for such reports of proceedings of the Institutes as the Board shall direct. He may appoint from the faculty or others employed by the Board "Institute conductors," who may be designated to preside at Institutes and who shall have general charge of the program at the Institutes assigned to them. They may be required to report as to the conduct and result of the Institutes under their charge.

*RULES FOR THE ORGANIZATION OF COUNTY FARMERS' INSTITUTE SOCIETIES AND THE CONDUCT OF INSTITUTES.

1. Counties desiring an Institute must first organize under the provisions of the law. To organize, at least twenty residents of the county, without regard to sex but of legal age, shall meet and adopt a brief constitution, forms for which are hereafter given, and by-laws, in harmony with the State law and the rules of the Board, and shall proceed to elect the following officers: A president, a vice president from each township in the county, and a secretary who may also be treasurer. The president and secretary, together with three vice presidents designated by the society, shall constitute an executive committee, who may be authorized by the society to transact the routine business of the society in connection with holding Institutes. Hereafter the annual election of officers shall be held during the annual Institute meeting, only members of the society being entitled to vote.

Each Institute Society shall immediately report its organization to the Superintendent of Institutes, accompanied by the name of the society, the name and postoffice address of each officer, and a copy of the constitution and by-laws. In case more than one such society shall be organized in a county the one first reporting shall be recognized as the Institute Society for that county, if it shall have been properly organized.

Provided, That any existing Institute Society in a county may be accepted as the legal Institute Society for that county. Such society shall furnish to the Secretary of the State Board of Agriculture a copy of its constitution and by-laws, and transmit with the same a written agreement, signed by the president and secretary of such society, stating that the society will conform to the general rules of the Board of Agriculture governing Farmers' Institutes. Such society will, at the next annual Institute held under the auspices of the Board of Agriculture, be expected to adopt the constitution prescribed by the Board, and to elect officers in accordance therewith.

Provided also, That in any county where there exists an active county agricultural society which is fairly representative of the whole county, such society may, for purposes of holding Farmers' Institutes, be accepted as the legal Institute Society for that county. Such society shall furnish to the Secretary of the Board of Agriculture a copy of its constitution and by-laws, and shall transmit with the same a written agreement, signed by the president and secretary of the society, stating that the society will, for the purposes of Farmers' Institutes, conform to the rules of the Board of Agriculture governing such Institutes.

2. The secretary of each Institute Society shall keep in a substantial book a record of all meetings of the executive committee and of the society, and a roll of the members, with the postoffice address of each.

3. When societies are notified of the date assigned for their Institute the executive committee shall proceed at once to complete the arrangements for their Institute by engaging a hall, selecting the local speakers desired, arranging for music, etc. The Superintendent shall send to the secretary of the Institute, at least six weeks before the date of the Institute, a list of speakers to be furnished by the Board, with the topics they are to discuss, and the time most convenient for the presentation of the same. The secretary shall complete the program by adding the local assignments, and shall have it printed immediately and shall see that copies are freely distributed among the farmers of the county. Should anything occur to make it necessary to change the date of or to abandon the meeting of the Institute, notice shall at once be sent to the Superintendent.

4. All Institute Societies organized or acting under the law shall be strictly nonpartisan and non-sectarian in every phase of their work, and no Institute shall be operated in the interest of any party, grange, alliance, farmers' club, sect or society, but for the equal good of all citizens and farming communities.

5. No subject shall be presented at the regular sessions of the Institute, nor any discussion allowed, of a partisan or sectarian nature, nor shall any speaker be allowed, in his lecture or speech or in any discussion, to advertise wares or schemes in which he has a pecuniary interest. But exhibits of farm and garden products,

*These rules are as revised by the Board of Agriculture in April, 1896.

and implements, devices, or materials used in rural life, shall be encouraged, and if possible a separate room shall be provided for such exhibit.

6. No fee shall be charged for admission to the annual Institute, nor contributions asked for, but all expenses shall be previously provided for. If the society desires to hold other meetings during the year the expenses of such meetings may be met as the society sees fit.

7.. An Institute Society may adopt such by-laws, in its discretion, as it may desire, provided that they are not in conflict with the rules of the Board of Agriculture.

8. An Institute Society desiring to conduct its own Institute without the aid of speakers furnished by the Board may apply to the Board for funds, not to exceed twenty-five dollars, for their use for such purpose. Said society shall give a satisfactory guarantee that such funds will be properly expended and shall transmit, within ten days after the Institute has closed, an itemized statement of the expenditures from said fund. No county taking advantage of this rule shall be furnished with any other aid, during the year, than from this fund.

9. Within ten days after the close of each Institute the secretary shall make a report to the Superintendent, blanks for which will be furnished by the Superintendent.

CONSTITUTION ADOPTED BY FARMERS' INSTITUTE SOCIETIES.

Article I. This organization shall be known as the ———————— County Farmers' Institute Society.

Art. II. The object of this society shall be the holding of at least one Farmers' Institute in this county each year, devoted to the dissemination among the people of information which shall aid in teaching better methods of farming, stock-raising, fruit culture, and all the branches of business connected with the industry of agriculture, and thus making the cultivation of the soil more profitable and rural life more attractive.

Art. III. Any resident of the county of legal age may become a member of this society by signing the constitution and paying a fee of —— cents, which shall be used for incidental expenses. This fee shall be the annual fee.* Only members of the society shall vote at the election of officers.

Art. IV. The officers of this society shall consist of a president, a vice president secretary shall keep, in a suitable book, a record of the transactions of the organization and a complete list of its members and their postoffice addresses. He shall also furnish to the Board of Agriculture such reports of the Institute as the Board may direct. The details of the business of the society shall be in the hands of an executive committee,, consisting of the president, secretary, and three vice presidents designated by the society.
from each township in the county, and a secretary who may also be treasurer. The

Art. V. The annual meeting of this society shall be held at the time of the annual State Institute, and the election of officers shall take place at this time.

Art. VI. This society shall meet the local expenses of State Institutes by membership dues or by voluntary contributions secured before the period of holding such Institutes.

Art. VII. This society shall endeavor to promote at the Institutes artistic and educational displays of rural products and devices to lighten labor; to avoid all discussions of a partisan or sectarian nature; not to allow any person in the lectures and discussions to advertise wares or schemes in which he has a direct or indirect pecuniary interest; and to secure publicity to the proceedings.

Art. VIII. This society shall be governed by, and shall at all times be subject to, the laws of the State and the rules of the State Board of Agriculture governing Farmers' Institutes.

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* The amount of the fee can be determined and inserted by each society, as it deems best.

OFFICERS FARMERS' INSTITUTE SOCIETIES

WITH NUMBER OF MEMBERS REPORTED

FOR INSTITUTE YEAR, 1896-7.

County.	Membership.	President.	Address.	Secretary.	Address.
Alcona	23	J. Van Buskirk	Harrisville	Geo. Colwell	Harrisville.
Alger [1]					
Allegan	78	F. W. Robinson	Fennville	L. C. Root	Allegan.
Alpena	27	E. O. Avery	Alpena	E. H. Toland	Ossineke.
Antrim	80	C. E. Mills	Mancelona	D. W. Marsh	Mancelona.
Arenac [2]		Peter Gilbert	Sterling	A. H. Welles	Standish.
Baraga [1]					
Barry	112	John Dawson	Hastings	R. M. Bates	Hastings.
Bay	70	T. F. Marston	Bay City	E. R Phillips	Bay City.
Benzie	74	Wm. G. Voorheis	So. Frankfort	R. B. Reynolds	Frankfort.
Berrien	52	C. H. Farnum	Benton Harbor.	C. B. Groat	Niles.
Branch	175	L. M. Marsh	Gilead	A. J. Aldrich	Coldwater.
Calhoun	110	Jacob Wartman	Albion	Wm. A. Powell	Marshall.
Cass	98	T. T. Higgins	Dailey	W. W. Reynolds	Cassopolis.
Charlevoix	57	M. M. Burnham	East Jordan	E. B. Ward	Charlevoix.
Cheboygan	79	Jas. Fenton	Manning	C. F. Smith	Cheboygan.
Chippewa	63	H. A. Osborn	Sault Ste. Marie	T. R. Easterday	Sault Ste. Marie
Clare [1]					
Clinton	43	Decatur Bross	St Johns	Geo. N. Ferrey	St. Johns.
Crawford	51	Oscar Palmer	Grayling	Henry Funck	Pere Cheney.
Delta [1]					
Dickinson	25	C. T. McElroy	Norway	L. F. Springer	Norway.
Eaton [2]		Jas. H. Gallery	Eaton Rapids	Geo. A. Perry	Charlotte.
Emmet	65	John Swift	Harbor Springs	Byron Bartlett	Harbor Springs
Genesee	86	Geo. W. Stuart	Grand Blanc	Jas. A. Button	Flint.
Gladwin	39	H. R. Clark	Gladwin	Edgar B. Lamphear	Gladwin.
Gogebic [1]					
G'd Traverse		Sam'l H. Sayler	Yuba	E. O. Ladd	Traverse City.
Gratiot	76	I. N. Cowdrey	Ithaca	C. A. Van Deventer	Ithaca.
Hillsdale	90	A. B. Cummins	Camden	Earl H. Dresser	Jonesville.
Houghton [1]					
Huron	211	John Hunt	Verona Mills	Mrs. Geo. Pangman	Verona Mills.
Ingham	72	Wm. H. Howlett	Dansville	L. H. Ives	Mason.
Ionia	227	Luther E. Hall	Ionia	C. I. Goodwin	Ionia.
Iosco	11	John Preston	Tawas City	Geo. Anschuety	Tawas City.
Iron	36	Wm. Greig	Iron River	P. O'Brien	Iron River.
Isabella	72	Wallace W. Preston	Mt. Pleasant	Michael E. Kane	Mt. Pleasant.
Jackson	80	E. A. Croman	Grass Lake	H. A. Ladd	Brooklyn.
Kalamazoo [1]					
Kalkaska	80	A. E. Palmer	Kalkaska	D. P. Rosenberg	Kalkaska.

OFFICERS FARMERS' INSTITUTE SOCIETIES, 1896-7.—Concluded.

County.	Membership.	President.	Address.	Secretary.	Address.
Kent	359	Wm. T. Adams	Grand Rapids	W. K. Munson	Grand Rapids.
Keweenaw[1]					
Lake	32	Spencer Freedenbergh	Chase	J. G. Rogers	Chase.
Lapeer	75	Wm. W. Stickney	Lapeer	G. W. Carpenter	Lapeer.
Leelanau[1]					
Lenawee[2]		Geo. B. Horton	Fruit Ridge	H. H. Ferguson	Adrian.
Livingston	54	J. B. Tazziman	Oak Grove	F. D. Filkins	Oak Grove.
Luce[1]					
Mackinac[1]					
Macomb	47	John McKay	Romeo	Geo. A. True	Armada.
Manistee	60	Jacob Sears	Harlan	J. Herbert Read	Harlan.
Marquette	25	Robt. Blemhuber	Marquette	Louis J. Lavoy	Harvey.
Mason	32	Jerome Harman	Ludington	W. J. Meisenheimer	Ludington.
Mecosta	69	Geo. W. Fuller	Morley	Mrs. C. H. Ludington	Morley.
Menominee	21	Edward Sawbridge	Stephenson	Norwood Bowers	Stephenson.
Midland	51	James G. Culver	Midland	Frank H. Olmsted	Midland.
Missaukee	45	Harvey Bartholomew	Pioneer	Jas. E. Wright	Lake City.
Monroe	64	E. L. Lockwood	Petersburgh	J. W. Morris	Monroe.
Montcalm	54	N. L. Otis	Palo	Geo. H. Lester	Carson City.
Montmorency[1]					
Muskegon	67	Geo. Bolt	Bailey	Chas. E. Whitney	Muskegon.
Newaygo	53	E. C. Tinney	Fremont	W. C. Stuart	Fremont.
Oakland	93	Peter Voorheis, Jr.	Pontiac	F. N. Clark	Milford.
Oceana	65	F. J. Russell	Hart	W. N. Sayles	Hart.
Ogemaw	50	C. J. Phelps	Damon	H. S. Karcher	Rose City.
Ontonagon	40	Jas. A. Crooker	Ontonagon	H. M. Powers	Ontonagon.
Osceola	66	O. L. Millard	Hersey	Will L. Richards	Hersey.
Oscoda	22	John Randall	Mio	Robert Kittle	Biggs.
Otsego	45	Jos. Glasson, Sr.	Gaylord	J. Berdine Scott	Gaylord.
Ottawa[3]	42	A. G. VanHees	Zeeland	Chas. S. Dutton	Holland.
Presque Isle[1]					
Roscommon	*	James H. Sly	Roscommon	Wm. F. Johnston	Roscommon.
Saginaw	44	Henry M. Youmans	Bridgeport	Jas. A Slocum	Saginaw, W. S.
Sanilac	100	Richard Pearson	Urban	E. M. Denton	Sanilac Centre.
Schoolcraft[1]					
Shiawassee	128	Elmer Warren	Ovid	Chas. B. Cook	Owosso.
St. Clair	27	Chas. S. King	Port Huron	Moses F. Carlton	Port Huron.
St. Joseph	129	C. A. Tyler	Nottawa	D. J. Porter	Three Rivers.
Tuscola	30	Chas. Selden	Vassar	Fred H. Orr	Caro.
Van Buren[1]					
Washtenaw	119	Wm. E Stocking	Ann Arbor	H. Stumpenhusen	Rawsonville.
Wayne	174	J. H. Vreeland	Wyandotte	J. H. Hanford	Plymouth.
Wexford	65	Barton Colvin	Wexford	Elwood Peck	Cadillac.

[1] Counties not organized under law of 1895.
[2] County agricultural societies acting as Institute societies under the rules of the State Board of Agriculture.
[3] Organized October, 1896.
* Not reported.

LECTURERS AT FARMERS' INSTITUTES, '96-7,

WITH TOPICS OF LECTURES.

We present below the names and addresses of persons who were sent by the Board as lecturers to the various Institutes. We have also given their topics, thinking such information might be of assistance in the future to secretaries of Institute societies in requesting topics or speakers, and also in arranging the local programs. We have divided the list of speakers into three classes:

I.

The following are regular employes of the State Board of Agriculture, and received *expenses only* while attending Institutes:

PROF. W. B. BARROWS, Professor of Entomology and Zoölogy, Agricultural College:
1—Insects of the garden and orchard.
2—Parasites of domestic animals.

DR. W. J. BEAL, Professor of Botany and Forestry, Agricultural College:
1—Clovers and grasses for Northern Michigan.
2—Forest control.
3—Some troublesome weeds and how to eradicate them.

HON. I. H. BUTTERFIELD, Secretary, Agricultural College:
1—The outlook for stock feeding.
2—The silo.
3—The present status of the thoroughbred animal on Michigan farms.

A. A. CROZIER, Assistant in Agriculture, Experiment Station, Agricultural College:
1—Green manuring.
2—Clovers and grasses.
3—The family fruit garden.

M. L. DEAN, Assistant in Horticulture, Agricultural College:
1—The potato patch.
2—Orchard fruits for Northern Michigan.
3—The apple orchard.
4—The home fruit garden.

DR. H. EDWARDS, Professor of English Literature and Modern Languages, Agricultural College:
Markets.

M. W. FULTON, Assistant in Agriculture, Agricultural College:
Farm fences.

H. P. GLADDEN, Assistant in Horticulture, Agricultural College:
1—Potato experiments at Michigan Experiment Station.
2—Spraying: For the average farmer who grows fruit.

DR. E. A. A. GRANGE, Professor of Veterinary Science, Agricultural College:
The structure of the milk glands of the cow, and diseases peculiar to them.

THOMAS GUNSON, Florist, Agricultural College:
1—A few thoughts on the care and value of flowers.
2—Flowers—their influence on rural life.
PROF. W. O. HEDRICK, Assistant Professor of History and Political Economy, Agricultural College:
Progress in tax reform.
DR. R. C. KEDZIE, Professor of Chemistry, Agricultural College:
1—Wheats for Michigan.
2—Forecasts of frosts.
3—The simpler chemistry of the soil.
4—Soil exhaustion.
5—Feeding the soil.
PROF. F. S. KEDZIE, Adjunct Professor of Chemistry, Agricultural College:
1—Keeping up soil fertility,—what it means and how it is done.
2—Some interesting points about soils.
C. E. MARSHALL, Bacteriologist, Experiment Station, Agricultural College:
Bacteria and their importance in our everyday life.
PROF. EDITH MCDERMOTT, Professor of Domestic Economy, Agricultural College:
Demonstration lectures in cooking.
PROF. H. W. MUMFORD, Assistant Professor of Agriculture, Agricultural College:
1—Ten points in taking care of farm stock.
2—Why and how should the farmer be educated?
PROF. C. D. SMITH, Professor of Agriculture and Director of Experiment Station, Agricultural College:
1—The home dairy vs. the factory.
2—Stall fixtures.
3—Forage crops and how to raise them.
4—The home dairy.
5—The art of buttermaking.
6—Principles of stock feeding.
DR. J. L. SNYDER, President, Agricultural College:
Practical education.
PROF. L. R. TAFT, Professor of Horticulture, Agricultural College:
1—Diseases of small fruits.
2—Diseases of pome fruits.
3—Diseases of stone fruits.
4—Treatment of plant diseases.
G. H. TRUE, Instructor in Dairying, Agricultural College:
1—Making butter in a dairy of less than five cows.
2—Better butter cows and how to get them.
3—Feeding the dairy herd in dry years.
PROF. H. K. VEDDER, Professor of Mathematics and Civil Engineering, Agricultural College:
Bridges and culverts for country highways.
PROF. C. F. WHEELER, Assistant Professor of Botany, Agricultural College:
1—Some bad weeds and how to eradicate them.
2—Smuts and rusts of grains.
3—Grasshoppers.
PROF. P. B. WOODWORTH, Assistant Professor of Physics, Agricultural College:
1—Water in physics.
2—Water in the air.
3—Water in the soil.
4—Water in plants.

II.

The following were employed especially for Institute work, and were paid a per diem and expenses while on such work:

HON. WM. BALL, Hamburg:
1—Value of improved stock and how to improve it.
2—How I grow wheat.
3—Maintaining soil fertility.
4—Does improved stock pay the average farmer today?
5—Busness sense in farming.
6—How I grow corn.

J. H. BROWN, Climax:
1—Value of corn fodder for stock.
2—Cleanliness and care in the dairy.
3—Keeping up fertility.
4—The educated farmer.
5—The home dairy.
6—The silo.
7—The feeding and care of a dairy herd.

C. B. CHARLES, Bangor:
Improving and utilizing low lands.

I. N. COWDREY, Ithaca:
1—Potato growing.
2—The home dairy.

E. A. CROMAN, Grass Lake:
1—Buttermaking in a small dairy.
2—Shall we farm without keeping live stock?
3—Clover and other forage crops.

A. P. GRAY, Archie:
1—The farmer's fruit garden.
2—The essentials of profitable apple growing in Michigan.
3—Cultivation and care of small fruits for market.

R. M. KELLOGG, Three Rivers:
1—Pruning—its objects and its limitations.
2—Small fruits for profit.

MRS. MATTIE A. KENNEDY, Slocums:
1—What we farmers' wives need.
2—Being a helpmeet.
3—The life we live.

MRS. MARY A. MAYO, Battle Creek:
1—Making housework easier.
2—Mother and daughter.
3—Poultry raising for the farmer's wife.
4—The unappreciated side of farm life.
5—Home life on the farm.

ROLAND MORRILL, Benton Harbor:
1—Apples and plums.
2—Small fruits for market.
3—Business methods in farming.
4—Peaches and plums.
5—The home fruit garden.
6—Benefits of intensive cultivation.
7—The apple orchard.
8—Objects and methods of pruning.
9—Value of commercial fertilizers in fruit growing.

A. E. PALMER, Kalkaska:
1—Silos and silage.
2—Essentials for successful farming in Northern Michigan.

MRS. ELLA E. ROCKWOOD,* Flint:
1—Fathers and sons: From a mother's standpoint.
2—Some helpful hints for women who make butter.
3—The ideal home.

JOHN L. SHAWVER, Bellefontaine, Ohio:
1—Farm buildings.
2—Clovers, manures, and fertilizers.
3—Seed time and harvest.
4—The home dairy.

J. N. STEARNS, Kalamazoo:
1—The essentials of profitable apple growing in Michigan.
2—Cultivation and care of small fruits for market.
3—The farmer's fruit garden.

* Mrs. Rockwood met an injury just previous to starting and was unable to attend any Institute.

HON. R. L. TAYLOR, Lapeer:
Bees and horticulture.

H. E. VAN NORMAN, Agricultural College:
The farm dairy.

A. M. WELCH, Ionia:
1—My experience with building and using silos.
2—Successful milk production.
3—Shall we buy or raise our cows?
4—Economical sheep feeding.
5—Winter feeding of cows, with and without silage.

III.

The following members of the State Board of Health spoke at various Institutes, for expenses only:

DR. H. B. BAKER, Secretary, Lansing.
PROF. DELOS FALL, Albion.
DR. MASON W. GRAY, Pontiac.
HON. A. V. MCALVAY, Manistee:
Prevention and restriction of communicable diseases.
HON. FRANK WELLS, Lansing:
Home sanitation.

FINANCIAL STATEMENT.

The following is table of expenses on account of Farmers' Institutes to May 1, 1897. The fund for the year ending June 30, 1897, is $5,000.

Salaries	$1,950 50
Travel	2,055 38
Stationery and printing	120 46
Apparatus	44 25
Sundry	145 89
Farm Home Reading Circle	45 25
	$4,361 73

"Salaries" includes salary of Superintendent, $50.00 per month; salary of Stenographer for three months at $30.00 per month; and per diem of lecturers named in Class II. of list of lecturers; found on another page.

"Travel" includes all hotel, railway and general traveling expenses of all workers at Institutes.

The law allows an expenditure from the Institute fund of not over $200 per year for the maintenance of the "Farm Home Reading Circle."

A more detailed statement of the Institute expense account for the year ending June 30, 1897, will appear in the report of the Secretary of the State Board of Agriculture bearing that date.

FARMERS' INSTITUTES HELD IN 1896-7,

WITH DATES AND ATTENDANCE.

The attendance is figured in the following manner: The Secretary of the Institute and the Conductor sent by the Board each reported the attendance by sessions. The estimate is based on the largest number present at any one time of the session. We have averaged the reports of the Secretary and the Conductor separately, and averaged the results. Occasional discrepancies indicate some careless counting. But by the method used we have probably attained a generally fair estimate of the average attendance at each Institute. The attendance includes that at women's sections.*

County.	Place.	Dates.	Reported by—	Attendance.								
				1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	7th session.	Average of each.	General average per session.
Alcona	Harrisville	Jan. 5-6, 1897	Conductor..	76	75	56	25	39	74	---	57	58
			Secretary...	72	75	60	25	40	80	---	59	
Allegan	Allegan	Jan. 11-12, 1897.	Conductor..	110	150	125	175	286	200	---	171	163
			Secretary...	80	175	125	120	286	150	---	156	
Alpena	Alpena	Jan. 6-7, 1897	Conductor..	35	156	100	40	50	----	---	76	74
			Secretary...	35	161	65	48	53	----	---	72	
Antrim	Mancelona	Dec. 1-2, 1896	Conductor..	60	110	80	65	96	140	---	91	96
			Secretary...	42	95	125	83	102	160	---	101	
Arenac	Standish	Feb. 4-5, 1897	Conductor.	----	75	200	80	200	250	---	161	220
			Secretary...	----	100	300	200	300	500	---	280	
Barry	Hastings	Dec. 15-17, 1896.	Conductor..	48	40	48	65	32	42	73	43	43
			Secretary...	Not reported.								
Bay	Auburn	Feb. 3-4, 1897	Conductor..	41	96	150	125	197	200	---	134	134
			Secretary...	Not reported.								
Benzie	Benzonia	Dec. 8-9, 1896	Conductor..	96	204	147	153	158	----	---	151	147
			Secretary...	95	188	125	115	200	----	---	144	
Berrien	Niles	Feb. 26-27, 1897.	Conductor..	150	380	470	350	470	----	---	364	349
			Secretary...	60	248	400	350	620	----	---	335	
Branch	Coldwater	Dec. 18-19, 1896.	Conductor..	200	550	700	250	350	650	---	450	475
			Secretary...	250	650	800	200	450	650	---	500	
Calhoun	Albion	Feb. 19-20, 1897.	Conductor..	175	476	310	243	400	100	---	340	309
			Secretary...	225	490	280	230	350	100	---	279	
Cass	Cassopolis	Feb. 25-26, 1897.	Conductor..	Not reported.								
			Secretary...	150	500	500	175	225	300	---	308	308
Charlevoix	East Jordan	Dec. 3-4, 1896	Conductor..	40	142	150	60	125	200	---	119	127
			Secretary...	35	142	200	75	110	250	---	135	
Cheboygan	Cheboygan	Dec. 16-17, 1896.	Conductor..	Incomplete.								
			Secretary...	Incomplete.								
Chippewa	Sault Ste. Marie	Dec. 17-18, 1896.	Conductor..	45	121	36	54	50	70	---	62	67
			Secretary...	45	132	45	65	90	60	---	72	

* For attendance at women's sections see p. xxi.

FARMERS' INSTITUTES HELD IN 1896-7.—Continued.

County.	Place.	Dates.	Reported by—	Attendance.								
				1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	7th session.	Average of each.	General average per session.
Clinton	St. Johns	Jan. 21-22, 1897	Conductor	79	165	90	105	127	45	...	101	101
			Secretary	Not reported.								
Crawford	Grayling	Dec. 7-8, 1896	Conductor	22	35	84	34	50	75	...	50	53
			Secretary	20	40	87	32	60	99	...	56	
Dickinson	Norway	Sept. 30-Oct. 1, 1896	Conductor	....	40	75	25	35	....	...	43	43
			Secretary	Not reported.								
Eaton	Charlotte	Jan. 20-21, 1897	Conductor	100	250	150	225	322	300	...	224	265
			Secretary	175	250	350	225	447	400	...	307	
Emmet	Harbor Springs	Dec. 2-3, 1896	Conductor	45	88	106	100	170	....	...	101	116
			Secretary	100	95	160	130	170	....	...	131	
Genesee	Flushing	Feb. 16-17, 1897	Conductor	175	525	450	200	450	450	...	376	396
			Secretary	250	300	400	350	500	500	...	416	
Gladwin	Gladwin	Dec. 2 3, 1896	Conductor	20	98	140	34	47	88	...	71	71
			Secretary	Incomplete.								
G'd Traverse	Traverse City	Dec. 4-5, 1896	Conductor	82	196	79	108	98	69	...	105	104
			Secretary	80	195	85	110	85	70	...	104	
Gratiot	St. Louis	Mar. 2-5, 1897	Conductor	386	675	300	807	800	450	875	....	596
	Round-up			8th	9th	10th						
				825	275	575	....	....	....	...	596	
Hillsdale	Hillsdale	Jan. 27-28, 1897	Conductor	85	180	140	65	233	65	...	128	128
			Secretary	Not reported.								
Huron	Bad Axe	Feb. 11 12, 1897	Conductor	75	410	425	200	350	495	...	325	340
			Secretary	78	410	470	160	460	550	...	355	
Ingham	Stockbridge	Jan. 18-19, 1897	Conductor	61	165	215	164	523	230	...	226	215
			Secretary	75	140	200	100	500	220	...	205	
Ionia	Ionia	Jan. 25-27, 1897	Conductor	Not reported.								
			Secretary	75	100	200	400	400	300	850	332	338
Iosco	Tawas City	Jan 7-8, 1897	Conductor	....	97	105	34	65	124	...	85	77
			Secretary	....	106	100	54	61	100	...	70	
Iron	Iron River	Sept. 28-29, 1896	Conductor	....	47	150	40	100	....	...	84	85
			Secretary	....	40	200	35	75	....	...	87	
Isabella	Mt. Pleasant	Jan. 20-21, 1897	Conductor	200	324	400	200	250	600	...	329	347
			Secretary	250	399	450	250	350	500	...	366	
Jackson	Brooklyn	Feb. 17-18, 1897	Conductor	120	392	240	156	220	265	...	232	230
			Secretary	126	389	305	154	133	291	...	229	
Kalkaska	Kalkaska	Nov. 30-Dec. 1, 1896	Conductor	62	107	92	74	78	112	...	87	116
			Secretary	65	137	125	78	80	250	...	145	
Kent	Grand Rapids	Feb. 23-24, 1897	Conductor	Not reported.								
			Secretary	240	410	125	450	450	100	...	295	295
Lake	Chase	Dec. 16-17, 1896	Conductor	55	92	142	87	176	164	...	116	134
			Secretary	96	125	153	87	261	200	...	153	
Lapeer	Lapeer	Feb. 2-3, 1897	Conductor	100	300	200	200	461	300	...	260	285
			Secretary	200	300	300	250	511	300	...	310	
Lenawee	Adrian	Jan. 27-29, 1897	Conductor	Not reported.								
			Secretary	100	125	200	350	350	625	...	291	291

FARMERS' INSTITUTES HELD IN 1896-7.—Continued.

County.	Place.	Dates.	Reported by—	Attendance. 1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	7th session.	Average of each.	General average per session.
Livingston	Howell	Jan. 15-16, 1897	Conductor	130	340	350	150	500	200	---	278	309
			Secretary	200	350	400	150	450	500	---	341	
Macomb	Armada	Jan. 12-13, 1897	Conductor	150	225	250	175	400	200	---	233	227
			Secretary	180	200	200	150	400	200	---	221	
Manistee	Copemish	Dec. 7-8, 1896	Conductor	110	216	250	150	200	320	---	207	209
			Secretary	110	216	250	160	220	320	---	212	
Marquette	Marquette	Sept. 23-24, 1896	Conductor	28	40	300	....	60	350	---	155	171
			Secretary	39	62	322	....	69	447	---	187	
Mason	Scottville	Dec. 15-16, 1896	Conductor	43	59	126	53	137	236	---	109	109
			Secretary	Not	rep	ort	ed.					
Mecosta	Morley	Jan. 18-19, 1897	Conductor	54	101	225	75	200	350	---	167	151
			Secretary	50	111	200	75	125	250	---	135	
Menominee	Stephenson	Oct. 1-2, 1896	Conductor	75	150	300	125	175	200	---	170	205
			Secretary	200	250	300	200	250	250	---	241	
Midland	Midland	Dec. 1-2, 1896	Conductor	48	140	150	50	100	175	---	110	92
			Secretary	25	140	100	40	75	75	---	75	
Missaukee	Lake City	Dec. 11-12, 1896	Conductor	Not	rep	ort	ed.					
			Secretary	Not	rep	ort	ed.					
Monroe	Monroe	Jan. 28-30, 1897	Conductor	Not	rep	ort	ed.					
			Secretary	92	43	87	125	60	100	132	91	91
Montcalm	Carson City	Jan. 19-20, 1897	Conductor	126	285	182	187	272	310	---	227	239
			Secretary	126	296	205	189	352	346	---	252	
Muskegon	Muskegon	Jan. 14-15, 1897	Conductor	111	211	126	150	130	148	---	146	156
			Secretary	150	211	128	154	176	184	---	166	
Newaygo	Fremont	Jan. 15-16, 1897	Conductor	150	242	225	225	250	350	---	240	226
			Secretary	130	242	235	225	250	200	---	213	
Oakland	Milford	Jan. 13-14, 1897	Conductor	125	350	425	250	650	650	---	408	438
			Secretary	160	400	500	300	750	700	---	468	
Oceana	Shelby	Dec. 15-18, 1896	Conductor	76	158	257	160	215	397	145	....	211
				8th	9th	10th	11th					
				190	435	125	165	....	---	---	211	
Ogemaw	Rose City	Dec. 3-4, 1896	Conductor	....	50	125	35	108	200	---	103	110
			Secretary	....	50	125	35	178	200	---	117	
Ontonagon	No Institute on account of the great fire.											
Osceola	Hersey	Dec. 17-18, 1896	Conductor	56	67	121	59	165	89	---	92	104
			Secretary	55	85	120	95	224	125	---	117	
Oscoda	Mio	Dec. 9-10, 1896	Conductor	25	50	90	28	50	....	---	48	44
			Secretary	25	50	50	25	50	....	---	40	
Otsego	Gaylord	Dec. 15-16, 1896	Conductor	Not	rep	ort	ed.					
			Secretary	40	207	100	45	65	140	---	99	99
Ottawa	Holland	Jan. 12-13, 1897	Conductor	87	126	76	98	173	136	---	116	116
			Secretary	90	130	65	115	168	130	---	116	
Roscommon	Roscommon	Dec. 4-5, 1896	Conductor	8	30	90	15	87	100	---	55	55
			Secretary	Not	rep	ort	ed.					

FARMERS' INSTITUTES HELD IN 1896-7.—Concluded.

County.	Place.	Dates.	Reported by—	Attendance.								
				1st session.	2d session.	3d session.	4th session.	5th session.	6th session.	7th session.	Average of each.	General average per session.
Saginaw	Chesaning	Jan. 22-23, 1897	Conductor	225	150	130	125	175	200	...	167	155
			Secretary	195	150	120	110	160	125	...	143	
Sanilac	Croswell	Feb. 9-11, 1897	Conductor	220	311	122	475	610	225	262	317	317
			Secretary	Not	rep	o r t	ed.					
Shiawassee	Laingsburg	Jan. 21-22, 1897	Conductor	100	180	280	200	350	340	...	241	237
			Secretary	100	175	280	200	350	300	...	234	
St. Clair	Emmet	Feb. 9-10, 1897	Conductor	210	350	255	350	480	300	500	349	365
			Secretary	200	350	300	400	500	400	525	382	
St. Joseph	Three Rivers	Feb. 24-25, 1897	Conductor	165	625	550	250	450	475	...	419	434
			Secretary	100	650	600	400	450	500	...	450	
Tuscola	Vassar	Feb. 1-2, 1897	Conductor	60	300	370	320	447	500	...	332	322
			Secretary	100	250	350	150	522	500	...	312	
Washtenaw	Chelsea	Jan. 19-20, 1897	Conductor	87	231	164	157	529	287	...	242	242
			Secretary	87	231	164	157	529	284	...	242	
Wayne	Plymouth	Jan. 14-15, 1897	Conductor	169	229	387	244	612	550	...	365	370
			Secretary	150	300	350	300	650	500	...	375	
Wexford	Sherman	Dec. 9-10, 1896	Conductor	35	121	166	54	91	133	...	100	100
			Secretary	35	121	166	54	91	133	...	100	

NOTE.—Average per session for all Institutes held, except one-day meetings, 201.

OFFICERS FARMERS' INSTITUTE SOCIETIES,

WITH NUMBER OF MEMBERS REPORTED

FOR INSTITUTE YEAR 1897-8.

Counties.	Membership.	President.	Address.	Secretary.	Address.
Alcona	20	Jos. Van Buskirk	Harrisville	Geo. W. Colwell	Harrisville.
Alger [1]					
Allegan	75	A. J. Bracelin	Allegan	L. C. Root	Allegan.
Alpena	16	E. O. Avery	Alpena	E. H. Toland	Ossineke.
Antrim	70	Philip Mudge	Eastport	C. E. Ramsay	Central Lake.
Arenac	68	Peter Gilbert	Sterling	Angus McDonald	Omer.
Baraga [1]					
Barry	49	J. J. Perkins	Prairieville	A. C. Towne	Milo.
Bay	†	L. W. Oviatt	North Williams	F. W. Dunham	West Bay City.
Benzie	40	Wm. G. Vorheis	S. Frankfort	R. B. Reynolds	Frankfort.
Berrien	79	R. V. Clark	Buchanan	W. H. Seitz	Royalton.
Branch	145	Abram L. Smith	Girard	A. L. Bowen	Quincy.
Calhoun	112	L. L. Harsh	Union City	J. M. Failing	Tekonsha.
Cass	37	J. W. Springsteen	Dowagiac	Robert Wiley	Dowagiac.
Charlevoix	42	M. M. Burnham	East Jordan	E. B. Ward	Charlevoix.
Cheboygan	60	P. L. Lapres	Cheboygan	C. F. Smith	Cheboygan.
Chippewa	128	E. C. Davidson	Rudyard	T. R. Easterday	S'lt Ste. Marie.
Clare [1]					
Clinton	40	Wm. Bird	Duplain	Geo. N. Ferrey	St. Johns.
Crawford	38	Oscar Palmer	Grayling	Henry Funck	Pere Cheney.
Delta [1]					
Dickinson	25	John Perkins	Norway	L. F. Springer	Norway.
Eaton [2]		Jas. H. Gallery	Eaton Rapids	Geo. A. Perry	Charlotte.
Emmet	25	Wm. Atkins	Petoskey	E. A. Botsford	Petoskey.
Genesee	87	Geo. W. Stuart	Grand Blanc	H. L. Freeman	Flushing.
Gladwin	12	Frank Leonard	Gladwin	E. B. Lamphear	Gladwin.
Gogebic [1]					
Grand Traverse	215	S. H. Sayler	Yuba	E. O. Ladd	Traverse City.
Gratiot	179	Jotham Allen	Ithaca	C. A. Van Deventer	Ithaca.
Hillsdale	†	A. B. Cummins	Hillsdale	Earl H. Dresser	Jonesville.
Houghton [1]					
Huron	130	Richard Parr	Rescue	Mrs Geo. Pangman	Verona Mills.
Ingham	34	W. H. Howlett	Dansville	L. H. Ives	Mason.
Ionia	161	Arthur P. Loomis	Ionia	W. W. Bemis	Ionia.
Iosco	31	John Preston	Tawas City	Geo. C. Anschuety	Tawas City.
Iron	†	W. S. Greig	Iron River	P. O'Brien	Iron River.
Isabella	77	Wallace W. Preston	Mt. Pleasant	M. E. Kane	Mt. Pleasant.
Jackson	†	Ben F. Peckham	Parma	J. Weston Hutchins	Hanover.
Kalamazoo [1]					
Kalkaska	71	A. E. Palmer	Kalkaska	James Greacen	Kalkaska.

OFFICERS FARMERS' INSTITUTE SOCIETIES.—Concluded.

County.	Membership.	President.	Address.	Secretary.	Address.
Kent	106	Wm. T. Adams	Grand Rapids	Wm. K. Munson	Grand Rapids.
Keweenaw[1]					
Lake	67	Earnest Nichoson	Luther	A. A. Miner	Luther.
Lapeer	72	W. W. Stickney	Lapeer	G. W. Carpenter	Lapeer.
Leelanau[1]					
Lenawee[2]		Geo. B. Horton	Fruit Ridge	H. H. Furguson	Adrian.
Livingston	70	J. B. Tazziman	Oak Grove	F. J. Fishbeck	Howell.
Luce[1]					
Mackinac[1]					
Macomb	80	John McKay	Romeo	Wm. M. Chapman	Romeo.
Manistee	122	A. W. Farr	Onekama	J. H. Read	Pomona.
Marquette	49	Robert Blemhuber	Marquette	Lewis J. Lavoy	Harvey.
Mason	43	John C. Griffin	Scottville	L. W. Rose	Wesley.
Mecosta	21	Wm. Ladner	Big Rapids	D. W. Stewart	Big Rapids.
Menominee	15	Edward Sawbridge	Stephenson	Norwood Bowers	Stephenson.
Midland	54	James G. Culver	Midland	Frank H. Olmsted	Midland.
Missaukee	22	Harvey Bartholomew	Pioneer	D. D. Walton	Lake City.
Monroe	221	E. L. Lockwood	Petersburg	Henry H. Herkimer	Exeter.
Montcalm	44	John E. Taylor	Greenville	S. K. Marsh	Sheridan.
Montmorency[1]					
Muskegon	55	J. J. Gee	Whitehall	A. B. Sumner	Montague.
Newaygo	67	Robert McKinley	Ashland	W. C. Stuart	Fremont.
Oakland	58	J. G. Noble	Oxford	James Y. Clark	Orion.
Oceana	69	F. J. Russell	Hart	W. N. Sayles	Hart.
Ogemaw	56	C. J. Phelps	West Branch	H. S. Karcher	Rose City.
Ontonagon	40	Jas. A. Crooker	Ontonagon	H. M. Powers	Ontonagon.
Osceola	32	B. G. Moulton	Leroy	S. Boroker	Leroy.
Oscoda	36	Stuart Gorton	Luzerne	Robert Kittle	Biggs.
Otsego	32	Joseph Glasson, Sr.	Gaylord	R. D. Bailey	Gaylord.
Ottawa	90	Geo. H. Souter	Holland	W. E. Bond	Holland.
Presque Isle[1]					
Roscommon[3]	†				
Saginaw	45	H. M. Youmans	Bridgeport	J. A. Slocum	Saginaw, W. S.
Sanilac	223	Henry Oldfield	Port Sanilac	Henry Ruttle	Carsonville.
Schoolcraft[1]					
Shiawassee	44	James N. McBride	Burton	Chas. B. Cook	Owosso.
St. Clair	190	Charles S. King	Port Huron	James Duan	Emmet.
St. Joseph	44	Comfort A. Tyler	Nottawa	Dison J. Porter	Three Rivers.
Tuscola	51	*C. R. Selden	Vassar	Fred H. Orr	Caro.
Van Buren[1]					
Washtenaw	83	E. A. Nordman	Dexter	Henry Stumpenhusen	Rawsonville.
Wayne	102	P. B. Whitbeck	Plymouth	Herman Shoemaker	Wyandotte.
Wexford	58	Richard C. Norris	Cadillac	Elwood Peck	Cadillac.

[1] Counties not organized under law of 1895, at this date, May 1, 1897.
[2] County agricultural societies acting as Institute societies under the rules of the State Board of Agriculture.
[3] Failed to report officers.
* Deceased.
† Counties failing to report members.

SECOND ANNUAL

MICHIGAN ROUND-UP FARMERS' INSTITUTE,

HELD AT ST. LOUIS ON MARCH 2, 3, 4, 5, 1897,

UNDER THE LOCAL AUSPICES OF THE

GRATIOT COUNTY FARMERS' INSTITUTE SOCIETY.

REPORTED BY PROF. CLINTON D. SMITH, AGRICULTURAL COLLEGE.

PROGRAM.

Regular Sessions, in Opera House.

TUESDAY MORNING, MARCH 2.

Arrangement of Exhibits.

TUESDAY AFTERNOON.

1:20—Welcome.....Mayor Crandall, St. Louis
Response.....Hon. C. J. Monroe, South Haven
2:00—"Green manuring".....Mr. A. A. Crozier, Agricultural College
2:30—Discussion, led by.....A. E. Palmer and E. A. Croman
3:00—"An improved farm barn".....Mr. John L. Shawver, Bellefontaine, Ohio
3:30—Discussion.
4:30-5:30—Conference of officers and delegates of county Farmers' Institute societies.

TUESDAY EVENING.

7:00—Musical program.
7:30—"Bacteria and their importance in every-day life," illustrated with stereopticon .....Mr. C. E. Marshall, Agricultural College
8:30—"Prevention and restriction of communicable diseases," .....Dr. Henry B. Baker, Secretary State Board of Health

WEDNESDAY MORNING, MARCH 3—YOUNG MEN'S SESSION.

9:15-9:45—Conference of Farmers' Institute lecturers.
10:00—"Improving and utilizing low lands".....Mr. C. B. Charles, Van Buren Co.
10:30—Discussion.
11:30—"Making butter in a dairy of less than five cows,"
.....Mr. G. H. True, Agricultural College
11:30—Discussion, led by.....J. H. Brown and E. A. Croman

WEDNESDAY AFTERNOON.

1:30—"Recent progress in stock feeding"....Prof. C. D. Smith, Agricultural College
2:00—Discussion, led by.....A. M. Welch and Wm. Ball
2:30—"Sugar beet raising in Michigan".....Dr. R. C. Kedzie, Agricultural College
3:00—Discussion, led by.....Prof. C. D. Smith
3:45—Question Box.
4:30-5:30—Conference of officers and delegates of county Farmers' Institute societies.

WEDNESDAY EVENING.

7:00—"Flowers, their influence on rural life,"
.....Mr. Thomas Gunson, Agricultural College
7:25—Discussion.
7:45—"Home life on the farm".....Mrs. Mary A. Mayo, Battle Creek
8:10—Discussion.
8:30—"The surroundings of the farm home,"
.....Hon. Chas. W. Garfield, Grand Rapids

THURSDAY MORNING, MARCH 4.

9:15-9:45—Conference of Farmers' Institute lecturers.
10:00—"Pruning, its objects and its limitations"....Mr. R. M. Kellogg, Three Rivers
10:30—Discussion, led by Prof. L. R. Taft, Hon. R. L. Taylor and Mr. M. L. Dean
11:00—"Business methods in farming".....Mr. Roland Morrill, Benton Harbor
11:30—Discussion, led by.....Hon. Wm. Ball

THURSDAY AFTERNOON.

1:30—"Does improved stock pay the average farmer today?"
.....Hon. Wm. Ball, Hamburg
2:00—Discussion, led by.....Prof. H. W. Mumford and Sec'y I. H. Butterfield, Agricultural College.
2:30—"The forestry problem in Michigan".....Dr. W. J. Beal, Agricultural College
3:00—Discussion, led by.....Hon. Chas. W. Garfield
3:30—Question Box.
4:30-5:30—Conference of officers and delegates of county Farmers' Institute societies.

THURSDAY EVENING.

7:00—"Some observations on the old and noted fruit districts of Delaware, Maryland and New Jersey".....Hon. C. J. Monroe, South Haven
7:30—Discussion.
8:00—"Practical education".....Pres. J. L. Snyder, Agricultural College
8:30—Discussion.

FRIDAY MORNING, MARCH 5.

9:00-9:30—Conference of Farmers' Institute lecturers.
9:30—"Smuts and rusts of grain".....Prof. C. F. Wheeler, Agricultural College
10:00—Discussion.
10:30—"The essentials of profitable apple growing in Michigan,"
.....Mr. J. N. Stearns, Kalamazoo
11:00—Discussion, led by.....A. P. Gray and H. P. Gladden
11:30—Business meeting of the Gratiot County Farmers' Institute society.

FRIDAY AFTERNOON.

1:00—"Some insects of the orchard and garden,"
.....Prof. W. B. Barrows, Agricultural College
1:30—Discussion.
2:00—"Structure of the milk glands of the cow, and diseases peculiar to them,"
.....Dr. E. A. A. Grange, Agricultural College
2:30—Discussion, led by.....Sec'y I. H. Butterfield and A. M. Welch
3:00—Question Box and farewell meeting.

WOMEN'S SECTION—HELD IN PRESBYTERIAN CHURCH.

CONDUCTOR—MRS. MARY A. MAYO.

TUESDAY AFTERNOON.

1:30—Demonstration lecture in cooking, Prof. Edith McDermott, Agricultural College.
3:30—"Some points for women who make butter".....Mr. G. H. True, Agricultural College.
3:45—Discussion, led by.....Mrs. J. E. Long
Question Box.

WEDNESDAY AFTERNOON.

1:30— Demonstration lecture in cooking.....Prof. Edith McDermott
3:30—"Poultry raising for the farmer's wife".....Mrs. Mary A. Mayo
3:45—Discussion, led by.....Mrs. George Abbott
Question Box.

THURSDAY AFTERNOON.

1:30—"Some things we farmers' wives need,"
.....Mrs. Mattie A. Kennedy, Muskegon Co.
2:00—Discussion, led by.....Mrs. Otto Mey
2:30—"Mother and daughter".....Mrs. Mary A. Mayo
3:00—Discussion, led by.....Mrs. N. B. Jones, Lansing
Question Box.

FRIDAY AFTERNOON.

1:30—"The ideal home".....Mrs. L. W. Bliss, Saginaw
2:00—Discussion, led by.....Mrs. Stiles Kennedy
2:30—"Being a helpmeet".....Mrs. Mattie A. Kennedy, Muskegon Co.
3:00—Discussion.
Question Box.

TUESDAY AFTERNOON.

The session was opened at 1:50 p. m., by Kenyon L. Butterfield, Superintendent of Institutes, who said:

It is the practice of the State Board of Agriculture to have at the close of the institute season a "Round-up" meeting, so called, which is designed to be the largest and best of the year. At the "Round-up" institute the best speakers of the winter campaign are brought from the College, men who are versed both in the science and the practice of agriculture; with them are brought the best farmers, men who have made a success in agriculture, and who are at the same time able to couch their ideas in succinct and impressive English. But the idea must not obtain that you farmers are children to sit and listen to instruction; on the contrary, you are all to take a part in this exchange of experiences. After every paper ample time will be allowed for discussion, and every person in attendance is invited to take part therein. The value of the institute as a whole to the people in attendance is largely commensurate with the freedom of discussion. Note books will be provided, and you are urged to take notes of the papers and discussions. I am glad we came to St. Louis with the "Round-up." You have amply redeemed your pledges to make the meeting a success, so far as it is in your power so to do.

Mr. I. N. Cowdrey, President of the Gratiot County Institute Society, was then called to the chair, and said: I think the people of Gratiot county ought to congratulate themselves in getting the "Round-up" institute this year. There are eighty-three counties in the State, and hence it cannot return to Gratiot county in eight-three years, and moreover, if the present practice of the division of counties, naming them after distinguished statesmen or otherwise, continues, the "Round-up" might not come to Gratiot county in 2,000 years. This county is filled with Granges and farmers' clubs, hence there was no mistake in bringing the big institute of the season here.

WELCOME ADDRESS.

MAYOR C. H. CRANDALL, ST. LOUIS.

MR. CHAIRMAN, LADIES AND GENTLEMEN OF THE "ROUND-UP": In behalf of the citizens of St. Louis, it is with great pleasure I extend to you a hearty welcome. St. Louis feels honored by your presence, and our people are sensible of the honor paid them in rounding up your institute labors in our little city. We look upon this as one of the most important, if not the most important, gathering that has assembled within our borders for a long time. We are all interested in the industry of agriculture, for it is the most important of our country. Notwithstanding the assertions of some political speakers to the contrary, the fact still remains that our farming industries stand at the head, and tower above all other interests in this country. The whole world is looking to us for a part of its bread, therefore it is very important that the farmer should strive to bring the art of farming up to its very highest development,

and especially in these days, when it requires the most careful effort to make a living, or lay up a little for the rainy day.

To you, gentlemen, who have the charge and conduct of these Farmers' Institutes and of this "Round-up," I would say, go on with the good work of teaching our fellow men how to improve and make their labors more effective and lucrative. As long as the world stands we must have farmers, and the better their condition, the more scientific will be their efforts in that line. Education is the motive power that moves the whole world forward.

Do not draw the line of your teachings to the routine of raising vegetables and cereals and killing bugs—there are other enemies to fight, and your lesson will be only half learned if you cease your studies when you think you have mastered the science of agriculture.

One of the greatest questions before the world today is finance. The solving of this question correctly means to the American laborer manhood and freedom—incorrectly, bondage for ages to come. I will quote a few words from our great and lamented Abraham Lincoln, uttered at the close of our war: "I see in the near future a crisis approaching that unnerves me and causes me to tremble for the safety of my country. As a result of the war, corporations have been enthroned and an era of corruption in high places will follow, and the money power of the country will endeavor to prolong its reign by working upon the prejudices of the people until all wealth is aggregated in a few hands, and the republic is destroyed. I feel at this moment more anxiety for the safety of my country than ever before, even in the midst of the war. God grant that my suspicions may be groundless."

What a wonderful prophecy, and how terribly it is being fulfilled. Therefore I say to you, tell the farmers they must study this great question of questions, as well as farming. Never let up in their vigilance a moment, for that is the *price* of *liberty*.

And now, ladies and gentlemen of the "Round-up," I will express the hope and wish of our citizens that the few days that you spend here may be very pleasant and profitable, and that, in the busy days of your lives to come, you may sometimes recall agreeable memories of your visit to the little city on the Pine. I deliver the keys of the city into your keeping for four days. For four days the city is yours. We ask you to make your visit and enjoyment as complete as possible.

RESPONSE.

HON. C. J. MONROE, SOUTH HAVEN.

As representing the State Board of Agriculture, I want to express the thanks of the visiting farmers and of the board for the enthusiasm of the citizens of St. Louis who have undertaken to make this institute a success. All are agreed that when in making a call the hand shake is cordial and hearty, the visit is certain to be a pleasant one. The address of the mayor has certainly given a delightful opening to this meeting. The people here at St. Louis have taken hold of the matters preparatory to this institute in the right spirit and have fully met the expectations of the board. I hope the people, having attended and done their full part in the discussions, will feel that it had been good for them to be here.

GREEN MANURING.

A. A. CROZIER, AGRICULTURAL COLLEGE.

The object of this paper is to show that by a proper use of green manures a sufficient supply of nitrogen for ordinary crops can generally be maintained in the soil without resort to commercial fertilizers; also that the phosphoric acid and potash, the two other most important elements to be considered in connection with the fertility of the soil, can be preserved from loss, and the amount available for growing crops increased by the same means.

It is sometimes said that green manures give to the soil only what they have taken from it, and therefore cannot really add to its fertility. This is not true. The woody substance of plants all comes from the air, and in the case of the clover-like plants a large share of the nitrogen also.* Both these materials play very important parts in the fertility of the soil, the nitrogen in combination with certain materials in the soil acting as direct food, and the woody substance helping its fertility in various indirect ways, one of the most important of which is the retention of moisture. In regard to the phosphoric acid and potash, which comes from the soil itself, the growing plants return to the soil these elements in a more soluble condition than they generally exist in the soil. They add therefore to the available supply for the succeeding crop.

In our eastern climate the nitrogen of the soil rapidly disappears in the drainage water if not used by plants. It therefore requires frequent renewal, the best means being the use of some plant of the clover family. The phosphoric acid and potash on the other hand are mostly in a very insoluble condition, so that the occasional addition of vegetable matter containing these materials in a more soluble form is also desirable. The continual growing of vegetation upon the soil is very beneficial, even though a part of the time the vegetation may not be directly valuable as a crop. This is important, first, in order than plant food in solution in the soil may be taken up by the growing roots and not washed out of the soil; second, the growing roots of whatever kind act directly upon the fine rock particles of which the soil is composed and bring them into solution, taking up their plant food and carrying it forward for the use of future plants. There are many other minor advantages in having something growing upon the soil at all times, such as preventing the surface from washing, holding moisture, etc. The soil needs no rest.

WHEN TO GREEN MANURE.

When and where not to apply green manure, in the sense of turning under the entire crop as it grows, are questions to be determined by the individual farmer as circumstances dictate. A plant never contains more manurial value than when its growth is completed. If the crop is now cut and fed to stock, and all the manure carefully saved, about three-fourths of its manurial value can be returned to the soil. In most cases it is found

* This is accomplished by means of small tubercles upon their roots.

better to adopt this plan than to use a valuable fodder crop directly as manure. Then, too, the value of the stubble and roots must be considered. In the case of clover, these parts contain as much fertilizing value as the crop removed.

DISCUSSION.

A. E. Palmer of Kalkaska opened the discussion: I am unable to enter into any scientific discussion of this paper, but I can give you some points in my personal experience. Michigan is a large State, embracing localities with very different climatic influences. Hence the treatment which is best for one locality may not and indeed will not apply to other portions of the State. I come from the eastern part of the Grand Traverse region. In my farming in that locality I have made many mistakes and have found that what is good for one year will not fit the next season.

I follow green manuring as far as it is profitable. I find it impossible to manure all the farm highly. Where one part of the field is rich and the other part poor I grow green manure crops. Clover is one of the best plants for this purpose. All the legumes are gross feeders and collect and render available many pounds per acre of potash and phosphoric acid. Even if we draw off all the hay, we leave the roots, and in them a great deal of these materials. I attribute most of the value of these legumes to the fact that they are gross feeders with long roots and are thus able to accumulate the mineral elements which the soil needs and to bring them up from the lower strata to the surface.

Farmers should still place their chief reliance on barnyard manures. They should conserve them and use them judiciously. Dairy farmers make lots of manure, and it better to take off the forage crop and feed it, plowing under the consequent manure, than to plow under the crop as it grew. One bad feature of the green manuring is that the richer lands grow the bigger crops, while the poorer lands are not improved in the same proportion because the crops which grow on them are inconsiderable and hence do not add as much fertility as is added by a larger crop on richer ground. For this reason green manuring alone tends to make the richer lands better without adding proportionately to the poorer lands.

Peas and oats made into hay have been a crop that I have learned to depend upon. As soon as the peas and oats are removed I sow buckwheat or rye, or anything to cover the ground, not so much for adding fertility as conserving it. I believe that plowing under clover on rich land is wasteful, and I believe it is also questionable whether it is possible to build up light soil by green manuring alone. We must look at the whole question in a broad and common sense way. If the farmer is situated to feed economically and profitably the leguminous crops, I by all means advocate that method. If he is not so situated, then by all means raise them and plow them under. We must vary the rule to suit the farm, but I believe that it is questionable whether we can build up light soil by green manuring alone.

E. A. Croman, of Grass Lake, continued the discussion: I have brought up a farm from a run down condition until today it bears fine crops of clover, almost exclusively by green manuring. I began by sowing rye and plowing it under, gradually introducing other crops for this purpose, until today it bears as I have said, good crops of clover. I agree with the first speaker in believing that the ground should be kept covered. After oats sow rye, working the ground with a spring tooth harrow; then the next spring plow the rye under and sow clover or plant corn. Last spring I sowed clover on rye plowed under with good success. If you can't grow clover for plowing under then try peas.

R. M. Kellogg recommended cow peas as a proper crop for use in green manuring. It will grow very large, and as it is a nitrogen catcher it is as good as clover in that respect.

E. A. Croman: I have never seen land too rich. All the straw grown on my farm is used up there. I am not troubled with root borer and hence have a good crop of clover.

Q. Will cow peas grow here?

Mr. Kellogg: They will grow here but will not ripen seeds. They grow to a good height on properly prepared soil, and furnish a large amount of humus when plowed under.

Q. Some years ago it was stated that clover stubble plowed in was just as good as the whole crop. Is that so?

Mr. Croman: It depends upon the condition of the soil. Stubble is equal to the hay, pound for pound, as far as its fertility is concerned, but if the hay is removed it takes away fertility, since it is rich in potash, phosphoric acid, and nitrogen.

Q. How will it do to prepare the ground in the fall and sow in the spring?

Mr. Croman: It is not quite as good on account of the exposure of the bare ground in the winter. I would not roll after sowing, except on sandy soil, on account of the great evaporation of moisture after the roller. Always leave the surface of the ground harrowed and loose.

Q. Is there danger in too early sowing, on account of frosts?

Mr. Croman: Not much, although trouble from this source has been experienced.

Mr. Palmer: We have found in the northern part of the State that fall sowing is the only method to be used where snow covers the ground continuously during the winter.

Mr. Crozier: If stockmen cut the clover and feed it the animals take up 25 per cent of the fertilizing constituents only.

Mr. Palmer: The loss by plowing under is much more than 25 per cent, in fact not over one-third of the nitrogen in the clover plowed under is utilized in the succeeding wheat crop.

Mr. Crozier: The corn crop on a clover sod will utilize practically all of the nitrogen, because it has a whole season in which to grow.

Mr. Palmer: I still think that there is a useless loss of fertility by plowing a crop under as against removing the hay for feed, plowing under the stubble, and with it the carefully preserved manure from the animals to which the clover is fed.

Q. Is there any value in plaster on clover?

William Ball: Some years ago a benefit seemed to be derived from sowing plaster on clover, this benefit is not so apparent in later years. Possibly the land has all the plaster it needs at the present time.

Mr. Croman: I have found the best use of plaster to be in the stable and on the manure heaps as a conservator of the nitrogenous elements of the manure.

R. Morrill: I suggest a little caution in the use of green manure if injudiciously managed. I have seen positive injury on certain soils from plowing under heavy masses of green clover. Especially is this liable to occur when the subsequent season is dry. I have obtained the best results from allowing the crop to grow, fall down and get dry. I cut the clover to pieces with a disk harrow and then plow under. I find this better than souring the land by a heavy green crop. I have found it well to put in in the fall, fit in the spring, and draw the leguminous crop off, using coarse manure on the exposed knolls.

AN IMPROVED FARM BARN.

JOHN L. SHAWVER, BELLEFONTAINE, OHIO.

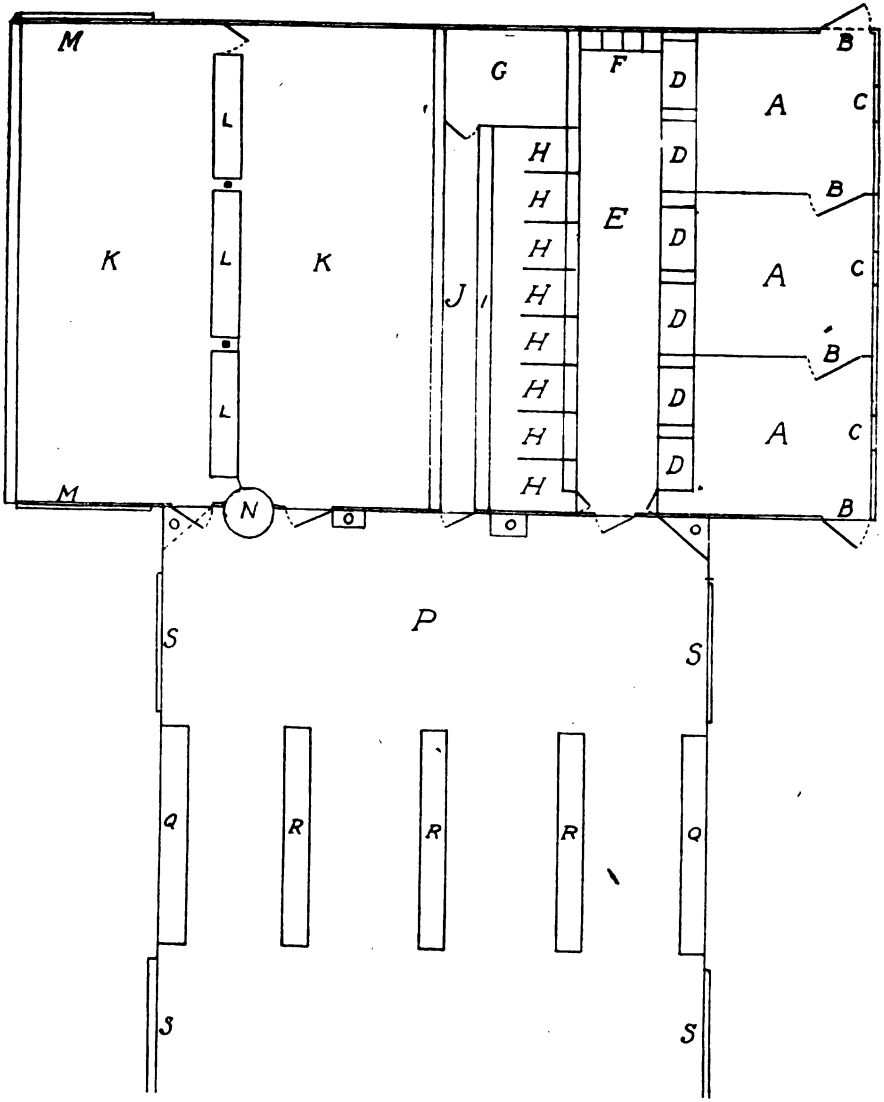
Every prudent farmer desires a barn sufficiently large to provide shelter for all his stock. If he be a specialist, he wants a barn fitted especially for the kind of stock he handles, but if he be engaged in mixed farming he will want a general purpose barn—one that will accommodate a few horses, a number of cows, and a flock of sheep. Of course he wants things so arranged as to be convenient and enable him to care for this stock with the least possible amount of labor.

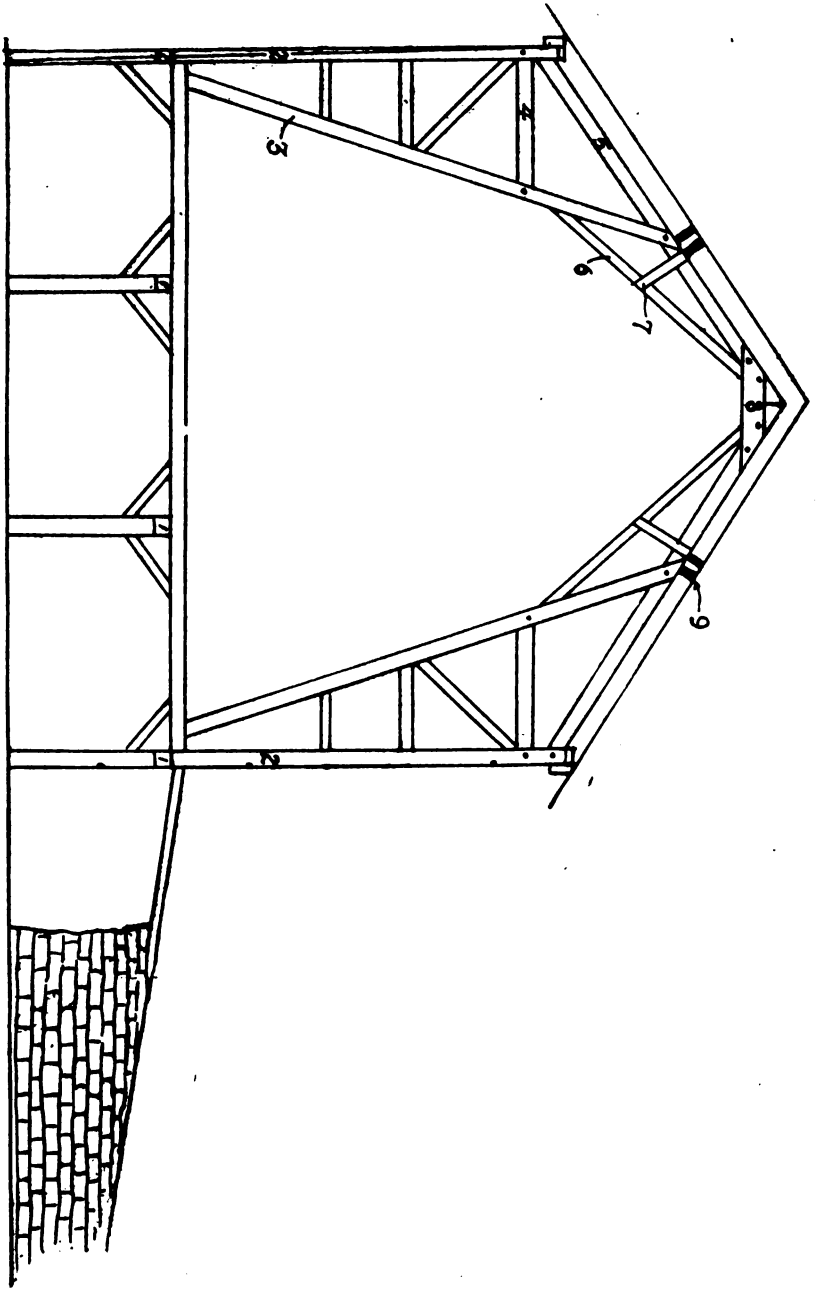
Having given this subject considerable investigation, and having made it an object to visit many of the best barns in this and adjoining states, I believe the accompanying plan will be found to possess as many advantages as can usually be found combined in one plan. It represents a barn 36 feet wide and 64 feet long. There are three large box stalls, "A," which will accommodate six horses. These are connected by doors, "B," and are lighted by windows, "C." The mangers, "D," are built directly above the sill and diverge towards both stables and feed room. The manger thus built occupies less room and suits the requirements of both animal and owner. The feeding alley, "E," is between horse stable and cow stable, so that both may be fed in a very few moments' time and with very few steps. The small boxes at "F" are feed boxes filled from large bins above the driveway by means of spouts. The bulk of the feed is thus out of the way while the small boxes which never get empty are convenient of access.

THE STALLS.

There are eight cow stalls in addition to the box stall at "G," which will be found very convenient in more ways than one. "I" represents the manure gutter and "J" the walk three feet wide. The gutter should be sufficiently deep to prevent the cows from stepping into it, and never

General Purpose Barn.





Interior Bent of Plank Frame Barn.

so wide but what both cows and attendants may step across. "K" and "K" are sheep stables, separated by the feed racks at "L" which are portable. "M" and "M" are large doors through which the manure spreader or wagon may be driven when the stables are to be cleaned out. Grain boxes are provided about the sides so constructed as to prevent the sheep standing in them.

BARNYARD.

"P" is a covered barnyard 40 feet wide and of any desired length. This communicates with the cow and sheep stables as well as with the horse stable. Here the manure is accumulated and saved from loss through exposure to rain, air and sunshine. The loft above receives the straw directly from the threshing machine, and being kept perfectly dry and bright is doubly valuable. From this loft the straw feeds down into the racks at "Q" or is pushed through the chutes at "O" "O" "O" "O" into the various stables for bedding. "R" "R" "R" are racks for feeding corn, clover or hay. "N" is the watering tank accessible to both sheep stables and the covered barnyard.

THE PLANK FRAME.

Such a barn may be built very cheaply by constructing the frame of plank. This system not only saves from one-third to one-half of the timber, but saves from seven to nine-tenths of the cost of framing the barn. Each of these items is well worth considering, and when, in addition, one gets a stronger, more durable and more convenient barn, the value becomes more greatly enhanced.

The truss work for supporting the roof not only provides great strength but it avoids any timbers which would interfere with the use of the horse fork or hay and grain slings. It also provides for a clear floor space over the entire floor of the superstructure.

These frames may be built with a curb or gambrel roof if so desired, by giving the roof supports sufficient pitch, permitting the purlin posts to extend past them, intersecting with the stays at any desired point to give half, three-fifths, or two-thirds pitch for the lower span and any desired pitch for the upper span.

The basements may also be constructed of planks, but they have not yet been sufficiently tested to warrant me in recommending them for general use, though I believe they are as strong as when made of square timber.

DISCUSSION.

Jotham Allen: How do you manage to splice your timbers?

Mr. Shawver: The whole barn may be made up of pieces six feet long by spiking on a short piece at the side. You will notice that planks have that advantage over solid timbers that they can be easily spliced.

R. Morrill: Won't the barn bulge out between the posts where you have such a long span?

Mr. Shawver: No, the bulging is done in barns with a timber frame from the hay and grain when settling catching the timbers, and twisting them. Now there is no chance of hay catching the beams of this barn because there are no beams.

Silas Moody: What size plank do you use?

Mr. Shawver: Two by six or two by eight for the main frame. If you use a slate roof I would use two by ten for the purlin.

A. B. Cook: Is there a sufficient extra gain in space in the gambrel roof to pay for the extra expense in building it?

Mr. Shawver: In Michigan the people seem to think so. In other states instead of making a gambrel roof they use longer posts and put on a roof with one-third pitch. You can put a gambrel roof on a plank barn easily by extending upward and outward a piece of plank from the purlin which will support another purlin at the junction of the roofs of different pitch. The roof that I recommend is self-supporting, although built of plank instead of heavy timber, and is free from the cross rods which get in the way of slings and horse forks. You will notice in our barn the way is perfectly clear for these appliances, and a person can take up a whole load at a pull if the team can draw it.

C. E. Vandeventer: Is a steel roof a good roof?

Mr. Shawver: No and yes. There is a good deal of danger of rust, and if you use a steel roof on the barn I would line it with felt to prevent contact with moisture arising from the newly stored crops. Otherwise the roof is desirable, although I have seen them blown off of the barn.

Q. What kind of a roof do you recommend?

Mr. Shawver: Slate.

Q. Is there not danger in its being broken by the hail stones?

Mr. Shawver: If the roof is steep there is no practical danger; if flat the slates may be broken but, if they are so broken, they may easily be replaced. It used to be almost impossible to replace a broken slate but, according to the new methods of putting them on, they may easily be replaced.

Jotham Allen: What pitch would you use?

Mr. Shawver: One-third pitch.

N. W. Gould: Would you use slate when you could get good shingles for $1.50 per thousand?

Mr. Shawver: No, shingles in that case would be cheaper. In Ohio they cost $3.20 per thousand.

R. Morrill: You cannot get good shingles for $2 per thousand in my part of the State. No. 1 shingles cost $2.25. The standard Chicago price is from $2.50 to $3. I should use slate by all means. There is no trouble from hail if you get heavy Vermont slate, and snow slides off readily. A slate roof will cost you about $7 per each 100 square feet.

Mr. Clark: How is the siding put on in your barn?

Mr. Shawver: I prefer vertical siding to horizontal siding, but the latter can be used as well as vertical siding, although in such case you would have to put in extra vertical posts.

TUESDAY EVENING.

Hon. C. J. Monroe of South Haven in the chair.

The session was opened by a delightful musical program of one-half an hour by the St. Louis orchestra.

THE IMPORTANCE OF BACTERIA IN OUR EVERY DAY LIFE.

MR. C. E. MARSHALL, AGRICULTURAL COLLEGE.

If we were to study a garden plant, we should find its structure very complex. You are acquainted with the honeycomb, made up of innumerable cells, each having a distinct structure. In the garden plant we find the same plan—a multiplicity of cells making up the entire plant, but these cells, instead of being visible to the naked eye as in the honeycomb, are usually beyond its vision. Bacteria are plants composed of single cells and these single cells may be likened to the individual cells of a garden plant, yet they are different in certain respects. Each cell of the garden plant has life, but that life is dependent upon the other cells entering into the structure of that plant; that is, a single cell from the garden plant cannot live by itself. It has its life only through the life of all the other cells forming the plant as a whole. We can very well imagine, however, one of these innumerable cells to possess a distinct existence and to possess also all the functions of the garden plant as a whole. When we have done this, we have gained a fair conception of a bacterial cell. This bacterial cell is a distinct plant in itself. It possesses all the functions of a plant such as the garden plant. We would therefore define bacteria as single cell plants.

These cells are not always the same in size, in thickness or in length, neither are they the same in form. In these respects they correspond to all living cells, including those in the plant and animal kingdoms.

THREE CLASSES OF BACTERIA.

There are three distinct forms of bacterial cells,—first, a rod-shaped form, resembling in rough the appearance of a lead-pencil, called a bacillus, plural bacilli; then there is the spherical form, resembling a diminutive ball, called a micrococcus, plural micrococci; and again there is the spiral form, resembling a cork screw, the spirillum, plural spirilla. These three classes might be said

Fig. 1.—Bacilli.

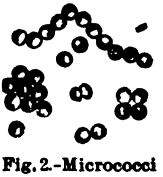


Fig. 2.-Micrococci

Fig. 3.—Spirilla.

to constitute that grand class of microscopic plants known as bacteria, also sometimes spoken of as micro-organisms, microbes, and even germs. These terms are usually used synonymously.

There are certain properties possessed by these cells which are of much interest. The cell, in the first place, is made up of a sheath or cell-wall which encloses a mesh-work, and in the meshes is found a semi-fluid mass, jelly-like, transparent and glistening. In some instances attached to these cells is a lash-like appendage, sometimes several, analogous to a tail, which aids in the propulsion of these cells, when suspended in a liquid substance. One property which is more prominent than others and which has attached to it vital and practical application, is the capability of certain species of bacteria to produce spores or little oval bodies within the cell. Wherever we have the spores in the bacterial cells, we have species of bacteria which will resist a high degree of heat and ordinary external agents. These spores are known to resist twelve hours of boiling, to withstand freezing and thawing for an indefinite time, to pass unchanged through many chemical solutions made for their destruction. It is the spore that we have to contend with, usually, in the preservation of foods. Still another property to which I wish to call your attention is the manner of multiplication. The spore which has just been mentioned simply propagates the species; that is, a single cell produces a single spore, then dies. From this single spore arises a single cell, so that there is no multiplication whatever. The manner in which bacteria multiply is by division or fission. One micro-organism divides in two by constriction, these two divide in four, these four in eight and so on, in a geometrical ratio.

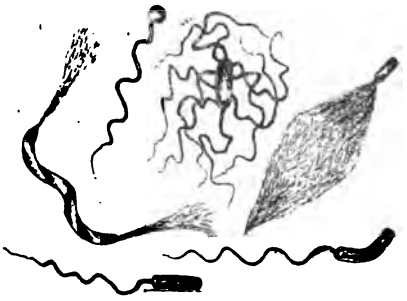


Fig. 4.—Flagella.

Fig. 5.—Spores.

THE IMPORTANCE OF BACTERIA

in our every day life comes not so much from a study of their morphological properties, but from the study of their activities,—what they do for us and what they do to antagonize us. We have our plants which are useful and indeed necessary for our sustenance; and again, we have our plants which seem to torment us by crowding in upon the useful and necessary plants.

With bacteria, there are those which are as essential to life as any of the higher plants; and there are those which work harm. The housewife who uses a cake of yeast to start her bread or to raise her buck-

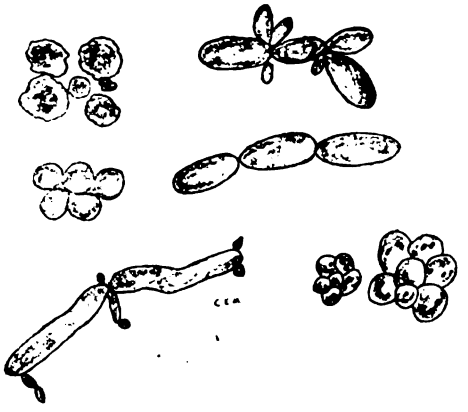


Fig. 6.—Yeast Cells.

wheat cakes, would better appreciate her own acts were she familiar with the habits of the plant that causes her dough to rise or her pancakes to become light. Into the sponge and into the pancake batter she simply inserts a minute plant which, if the proper conditions are furnished, will perform what she desires. If she understands the eccentricities of the microbes, she will be better able to provide them with their life requirements and thus facilitate her work. In her canned fruit, when it works, she also meets these plants. If in canning she excludes all life, her fruit will keep indefinitely, but allow a single spore to enter, the inevitable working will begin. The working of canned fruit is merely the manufacture of alcohol and acids out of the sugar present through bacterial activity.

THE ACTION OF BACTERIA UPON MILK

has become a study of deep import, especially to the dairyman. It is impossible in these times to consider the changes in milk or its products, without considering the bacteria associated with them. Although if is of recent discovery that bacteria have a decided influence in the ripening of cream and the flavoring of butter, also in the ripening of cheese and its value, it is a discovery that invites further investigation and promises much; but as to its practical bearing and pecuniary worth, there can be no question. Within the past two or three years, there have been placed upon the market pure cultures of bacteria; that is, single species of bacteria, which, when introduced into cream, were not only capable of ripening the cream but were also capable of producing butter of excellent grain and of very good flavor. This is brought about by the action of the bacteria upon certain constituents of the cream. These constituents are broken up, resulting in the formation of certain products, which furnish flavor and aroma.

IN THE MANUFACTURE OF CHEESE.

It is a known fact that for years past certain moulds have been added in the ripening of cheese. The most highly priced cheeses on the market are the result of specific fermentations; and unless the specific microorganisms are added and the conditions for their growth observed, the fermentations are a failure. It is a matter of only a few years now that pure cultures will be employed in the production of cheese, the same as pure cultures are employed in the production of butter; but the reason this is not done is that the bacterial life of cheese is so little known.

Work has been begun to ascertain the exact relation of each species present in the cheese to the ripening process. This is a difficult task, much more so than in the case of cream ripening, and it will take considerable time to obtain satisfactory results. Although it may not be in place to speak of brewing or the manufacture of beer, it is so pertinent to the matter in hand that I cannot refrain from using it as an illustration. Twenty-five years ago, the manufacture of beer was a haphazard business, because sometimes the beer would be sour, bitter, slimy, or otherwise, and the product of manufacture for several days or months would be lost. The brewers of course obtained the product they desired, ordinarily, but the beer was susceptible to disease. Now it is entirely different, owing largely to the labors of one man for the past twenty-five years. A single species of yeast is at present used in the fermentation of the wort, and as long as the brewers hold to this single species they will obtain a uniform product that is free from disease-bacteria. They have no more losses and have gained millions of dollars from the scientific research of C. Hansen. What has taken place in the manufacture of beer will be repeated in the manufacture of butter and cheese. This is not an imaginary picture but is simply the trend of bacterial investigations of milk and its products.

A word can profitably be added in regard to

DISEASES OF MILK, BUTTER AND CHEESE.

However, it must be simply a word, although much time could be spent in the discussion of each disease. In Germany, dairymen have been troubled much with what they call *blau-milch*—blue milk. It is the result of a micro-organism which gains access to the milk, multiplies, and produces a blue pigment. There are bacteria, too, which will produce red milk, violet milk, orange milk—in short, milk of various colors. The ordinary souring of milk needs but a moment's attention. It is simply the conversion of the sugar of milk into lactic acid, which, in turn, precipitates the caseine. The production of butyric acid in milk by bacteria gives to it a rancid butter smell and to butter its rancidity. Again, we have ropiness of milk or cream, sliminess, bitterness, and several other changes which are due to the presence of undesirable bacteria. There are bacteria, too, which will transform milk into a watery substance, that is, they digest the caseine.

It must not be understood that what has been said in regard to the actions of bacteria upon milk is confined to that substance; in much the same way they extend to other foods and other changes. For instance, we have lactic acid and butyric acid in the stomach. We have bacteria in the intestines which assist in the digestion of food. We have the formation of pigment upon meats and starchy substances, so that we are able to trace certain actions of bacteria through various conditions and circumstances.

OTHER FUNCTIONS OF BACTERIA.

Bacteria and yeast plants have other functions which are not prominent in milk changes. The transformation that takes place in grape

juice when it is converted into wine is due to the activity of yeast plants. These micro-organisms are present on the grapes and grape leaves, and find their way into the grape juice, where they act upon the grape sugar and convert it into alcohol. Boiled fruit juices keep when they are corked tightly, because the life within the juice has been exterminated. If you wish to make vinegar rapidly, you will take an old vinegar barrel and put your cider into it, or if you have a new barrel in which you are to place your cider and wish to hasten the change, you will take some mother-of-vinegar and add to it. You simply inoculate it with bacteria which convert the alcohol formed by alcoholic ferments into acetic acid.

BACTERIA IN THE SOIL.

We now approach a consideration of bacteria in the soil. It was for many years supposed that we would eventually lose what nitrogen we have, which is so necessary to plant growth; and that finally our food supplies would be exhausted. In those days they had but one theoretical means of utilizing the large amount of free nitrogen in the air and making it fit for plant absorption; that was by electrical phenomena. Bacteriology has discovered a new means by which free nitrogen may be rendered suitable for the plant economy. Bacteria have been found which are able to convert free nitrogen into nitrates by a process of oxidation.

THE DECOMPOSITION OF BARE ROCKS

may be traced to the activity of bacteria. Residing upon these rocks are bacteria which are capable of taking traces of ammonia, free nitrogen and carbon dioxide gas from the air and converting them into nitric acid which acts upon the rocks and dissolves them. In this way sufficient soil is gained for the growth of such low forms of life as lichens, and these plants in turn pave the way for the growth of higher plants. The soil once formed has in it a certain amount of nitrogen; but as vegetation develops in that soil, the nitrogen is exhausted; or, if the nitrogen in the soil is in the form of nitrates, it is easily removed by its humidity. Consequently there is a gradual diminution in the quantity of nitrogen, either by the growth of plants or by drainage. Some means must be employed to give back to the soil the nitrogen it has lost and this means is either to supply the nitrogen in the form of nitrogenous fertilizers or to supply the bacteria which are able to utilize the nitrogen of the air. But, in supplying bacteria, it is necessary, if the results be effectual, to supply sufficient nitrogenous food for their growth and functions. Thus it is that in the fertilizing of land with barn yard fertilizers, more nitrogen is supplied to the soil than can be accounted for by the nitrogen added in the fertilizer. That is to say, the nitrogenous bacteria require a certain amount of nitrogenous food to furnish nitrogen to the soil. So far, we have simply mentioned that class of bacteria which assists in rendering the necessary nitrogenous food to plants. On the other hand, there is a class of bacteria which will undo the work of the class we have just discussed. The first class is known as nitrifying bacteria; the second class as denitrifying bacteria. This second class will reduce

nitrates, nitrites, and ammonium compounds to free nitrogen. Thus it is seen that this action is just the opposite of that carried out by the nitrifying bacteria.

BACTERIA AS FERTILIZERS.

As to the practical value of these soil ferments, it may be said that certain species have been found associated with leguminous plants and that they are necessary to their growth. Farther, in Germany, they have gone so far as to use pure cultures in fertilization. They inoculate some soil with the pure cultures and this soil is used at the planting time as a fertilizer; or, they insert the seeds in cultures of the bacteria and by this means convey to the earth a fertilizer of micro-organisms.

BACTERIA AS POISON PRODUCERS.

Most of the relations of bacteria thus far mentioned demonstrate to us the importance of bacteria in our daily lives, how they are of advantage to us and what they do for us. Their importance is also manifested from another side; how detrimental they are to us and what obstacles they place in the way of life. In the first place, bacteria can produce poisons which are so intense that our imagination is unable to grasp their power. To illustrate this we may cite the poison produced by the micro-organism of lock-jaw. Of this poison $\frac{1}{112000}$ of a grain is sufficient to kill a mouse weighing a half ounce, $\frac{1}{250}$ of a grain sufficient to kill a man weighing one hundred and fifty pounds. The activity of these poisons is comparable only to a very few vegetable poisons as abrin, a poison taken from the jequirity seed; the most intense of any of the vegetable poisons, $\frac{1}{100}$ of a grain being required to kill a man. From this it will be easily understood how it is that poisons are generated rapidly in putrefying substances and in substances which are undergoing scarcely any change whatever. From this it will be guessed that bacteria may produce intense poisons in milk without any perceptible change, in cheese, in meats, pressed meats, canned meats and other food stuffs. The housewife presses meat and places it away for a gala day; the weather is warm and everything teems with life, yet she does not notice that her pressed meat has undergone a change. It is placed upon the table for consumption. Shortly after the repast several who have partaken of the pressed meat are stricken down with sickness. Poisoning is suspected, the meat is handed to a chemist to search for metallic poisons, but he fails. During the period between the preparation of the meat and the time of eating, bacteria have been growing within the meat and have manufactured deadly poisons which are so intense that they are hardly comparable with known poisons. Poisoning cases which were formerly attributed to zinc and what not, are now accounted for through the activities of bacteria.

AS DISEASE PRODUCERS.

Perhaps the most interesting study of bacteria is their power to produce disease. We are almost justified in saying that nearly every con-

tagious or infectious disease is produced by a micro-organism, although this micro-organism may not necessarily be a bacterium. Among these diseases are numbered anthrax, quarter-evil, lock-jaw, tuberculosis, glanders, diphtheria, cholera, typhoid fever, lumpy-jaw, and others. Disease-bacteria gain access to the animal economy, there multiply and generate their specific poison which gives rise to the symptoms of the disease.

In some diseases, bacteria enter the body and are disseminated through the blood and organs, while in other diseases, the bacteria are confined to a single spot. In both cases, however, it is the poison that produces the symptoms. In anthrax, the bacteria are sometimes so numerous in a capillary blood vessel that they block up the vessel and sometimes even burst it. In diphtheria, the bacteria are usually found only on the false membrane and are not scattered throughout the body. The study of bacteria in connection with disease is indefinite. We are unable to represent this phase of bacteriology at this time.

THE PREVENTION AND RESTRICTION OF COMMUNICABLE DISEASES.

BY HENRY B. BAKER, M. D., SECRETARY STATE BOARD OF HEALTH.

Mr. President, Ladies and Gentlemen: After all, what is of more consequence to the farmer than his own life and health and the health of his family and friends? It is now a pleasure to speak on the subject of the health of the people, because so much on the subject has recently been learned which it is important that all should understand.

A few years ago, it was the common belief that about all that health officers were for was to search out and abate nuisances. Just how nuisances caused sickness no one pretended to know; but it was a common belief that about all the sickness which was preventable was caused by nuisances. Now we know that nuisances have very little to do with the causation of most of the important diseases. Now we positively know the causes of most of the important diseases; we know how to prevent and to restrict them; and these facts are not difficult to understand. The most important of these truths can easily be taught to school children. And it is important that such knowledge shall be taught to the school children, and should be discussed at such meetings as this, because we have learned that health officers and boards of health alone are powerless to restrict or prevent the most important diseases, and that it is only by the coöperation of all classes of people that these diseases *can* be restricted and prevented. Therefore, if these diseases are to be restricted or prevented in your community, you must understand that it is to be done by you *yourselves*, and if you and your associates do not know how to do it, and do not take the proper measures, it will not be done, and a considerable portion of you will continue to die prematurely as the people did in Bible times when it was written, according to Hosea—Chapter IV., sixth verse, "My people are destroyed for lack of knowledge."

What is this important knowledge which has recently been gained, and which is to make us "wise unto salvation" so far as relates to the most important causes of mortality in Michigan at the present time?

COÖPERATION FOR PUBLIC HEALTH.

One of the most important branches of the new knowledge is—that, *by means of systematic coöperation of the people*, progress can be made in the restriction and prevention of diseases which formerly, before the inauguration of such coöperation, was entirely impracticable. Evidences of the success which has attended the application of the system to communicable diseases are exhibited in the diagrams which are before you. (Here was explained the diagram "Lives Saved by Public Health Work," which shows that since the State board of health has been laboring for the restriction of certain diseases the mortality from scarlet fever in Michigan has been reduced to less than half what it was before, that the mortality from small-pox has been reduced to less than one-fifth what it was before, and that the mortality from typhoid fever has been lessened.)*

The results shown in that diagram are encouraging, but they are not entirely satisfactory, because the measures believed by the State Board of Health to be the best are not adopted in all localities. This other diagram, "Isolation and Disinfection Restricted Scarlet Fever and Diphtheria," etc., proves that in those localities in which the two measures recommended by the State Board of Health are fully adopted and enforced, the reductions of the sickness and mortality are much greater than in the State as a whole. In fact the reduction is so great that four-fifths of the cases and deaths are prevented, and only about two cases and a fraction of a death occur in each locality—after the disease has been brought into the locality. (Here was explained the diagram Plate 815, p. 23.)

Such measures of coöperation as have been inaugurated by the State Board of Health can be successfully applied to the prevention of diseases not communicable; but they are especially applicable to the restriction of communicable diseases. Therefore, one important branch of the knowledge is—that certain diseases, not heretofore so considered, are communicable diseases.

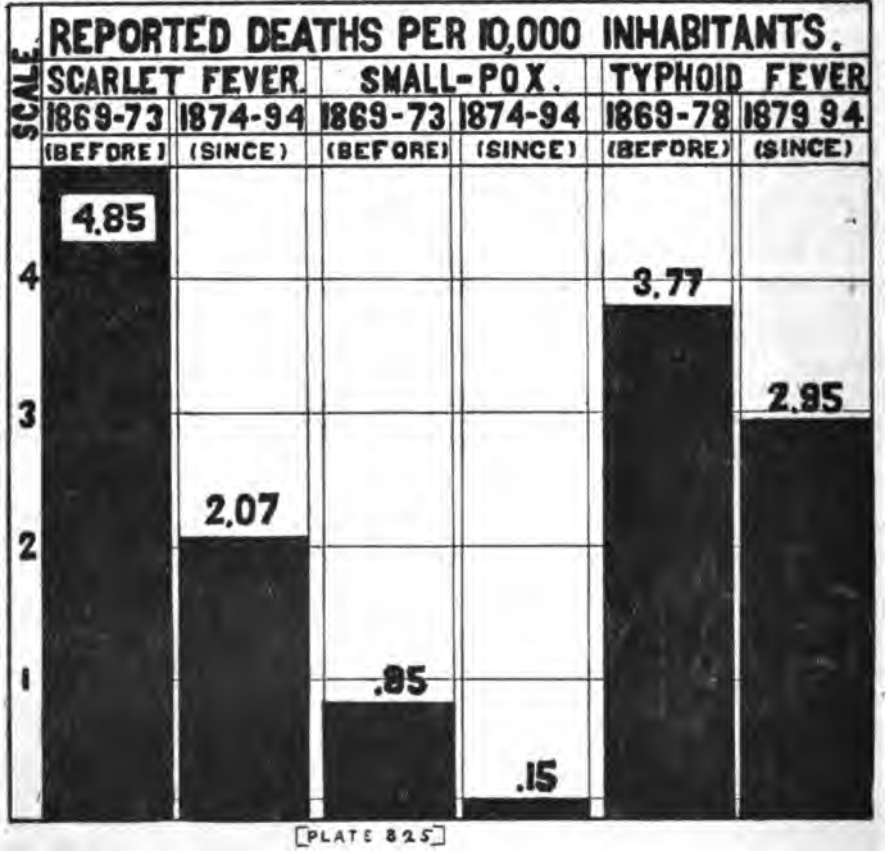
The almost perfect success with which scarlet fever has been restricted in localities in Michigan where the measures recommended by the State Board of Health have been adopted and enforced, proves that, for the restriction of a communicable disease, it is not at all essential that the specific cause of the disease shall have been discovered. But this rule applies to such diseases as are known to be communicable.

BACTERIOLOGY.

In such a disease as consumption, in which the period of incubation is so long that the communicability of the disease could not well be established to the satisfaction of all, through clinical evidence alone, there was no complete knowledge of just what to do to prevent or restrict the disease until its specific cause was

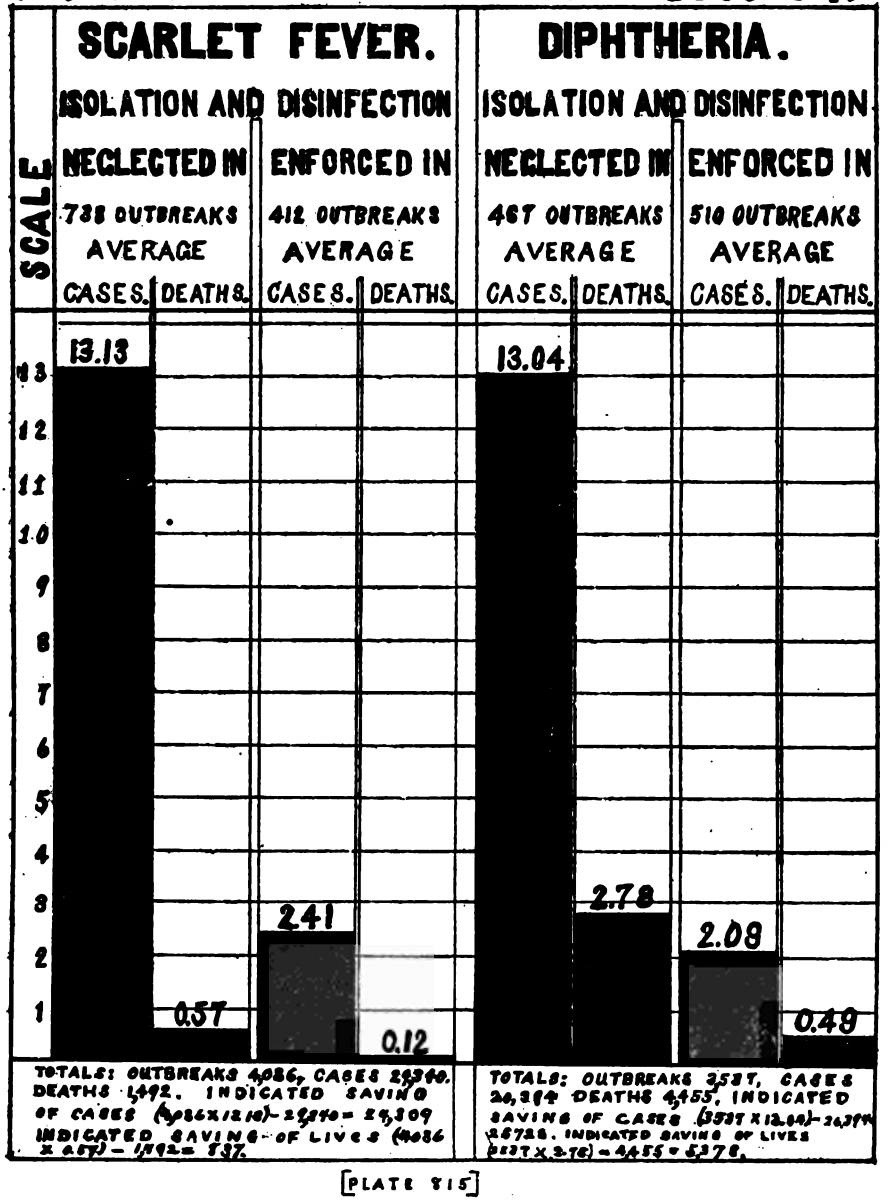
*This diagram is printed on page 22.

LIVES SAVED BY PUBLIC-HEALTH WORK. COMPARISON OF DEATH—RATES IN MICHIGAN FROM SCARLET FEVER AND SMALL-POX BEFORE AND SINCE THE STATE BOARD OF HEALTH WAS ESTABLISHED, AND FROM TYPHOID FEVER BEFORE AND SINCE ITS RESTRICTION WAS UNDERTAKEN BY THE STATE BOARD. (COMPILED FROM THE STATE DEPARTMENT'S "VITAL STATISTICS" OF MICHIGAN.)



[PLATE 825]

ISOLATION AND DISINFECTION RESTRICTED SCARLET FEVER AND DIPHTHERIA IN MICHIGAN DURING THE 8 YEARS 1887-'94.



[PLATE 815]

demonstrated. This was done relative to consumption by Doctor Koch, in 1882. Since then his work has been verified in thousands of instances.* For this exceedingly important knowledge we are indebted to what may be summed up in the single word "Bacteriology," which is the science which has resulted from what, a few years ago, was called the "Germ theory of diseases." Bacteriology is a science which deals with an immense class of vegetable organisms, too small to be seen by the naked eye, but which are just as real as are those numerous plants with which every farmer has to deal. Just as the farmer propagates plants by cuttings, so, in suitable soil or media, many of the bacteria may be propagated by division. Just as the farmer propagates many plants by sowing the seed, so many of the bacteria are reproduced by their spores. As the seeds of plants will withstand changes of temperature and dryness which would destroy the plants themselves, so the spores of some bacteria will withstand changes of temperature, and dryness which would destroy the bacteria themselves.

Some of the most destructive and most common diseases are now known to be caused by bacteria. That is true of consumption—the most common an dthe most destructive disease, in this part of the world. The micro-organism which reproduces itself in the human body and causes consumption, is rod-shaped, therefore, in technical language, it is a bacillus, that word meaning rod-shaped. The plural of bacillus is bacilli. (Pointed out a drawing of it in the diagram, which exhibited the germs of consumption, and of other diseases.)

Apparently, the consumption bacillus sometimes forms spores. And the disease is sometimes caused by injecting into animals substances derived from consumptives but in which no mature bacilli can be seen by the use of the microscope, the inference in such cases being that spores were present and reproduced the disease.

CONSUMPTION IS SPREAD

in several ways, but mainly by means of the sputa of consumptives, which sometimes contain untold millions of the germs of this disease.

* Consumption has been proved to be communicable by several distinct lines of evidence: Experimental, clinical, statistical, and bacteriological.

"The four rules of Koch have been generally conceded to be sufficient to show that a given germ is the *sole* and sufficient cause of the disease with which that germ is associated. Briefly, these rules are as follows:

"1. The germ must be present in all cases of that disease."

"2. The germ must be isolated from other organisms and from all other matter found with it in the diseased animal."

"3. The germ thus freed from all foreign matter must, when properly introduced, produce the disease in healthy animals."

"4. The micro-organism must be found properly distributed in the animal in which the disease has been induced."

* * * * * * * * * * * * * *

"When it is stated that the germ must be present in all cases of the disease, it must not be understood that an unlimited number of cases must be examined before the causal relation of a given organism to the disease may be reasonably suspected. This would require more than a lifetime, and would demand facilities for the studies of the special disease that do not and can not exist. The number of cases in which the germ is constantly found should be reasonably large, and the larger this number the greater the probability that the organism is etiologically related to the disease. Moreover, the germ may be present in all cases and yet it may not be found in all. To demand that it be found in all cases would be to presume that the methods of detecting and recognizing a given germ are perfect. There is no ground for this assumption."

Ptomains, Lucomains, Toxins and Antitoxins. (Third edition.) By Victor C. Vaughan, Ph. D., M. D., and Frederic G. Novy, Sc. D., M. D., Chap. V., p. 137.

These germs are not destroyed by drying, being similar in this respect to the seeds of grain which the farmer sows in the field. If a consumptive coughs and raises pus, commonly called matter, and spits on the floor of a public room like this, or of any room, as soon as the sputum is dry the dust from it is liable to rise and float about in the air, especially when the room is swept. The germs may then lodge on the window ledges and on any projecting surface, and be dislodged by any unusual current of air. When a person breathes such infectious dust, the chances are good that it will go no further than the moist hairs in the nose; or, if the dust goes into the mouth, that the germ-destroying white corpuscles, supplied by the tonsils, will surround the consumption germs and digest them. If, however, the person has been exposed to a cold, raw, windy atmosphere in which there was an excess of ozone, the throat and air-passages may be tender, and possibly inflamed through the action of the common pyogenic germs as those germs are called which cause pus to form; under such conditions, the germs of consumption are frequently able to gain a permanent lodgment in the body, to continue to reproduce themselves, and to cause the disease which we call consumption.

This brief outline of how consumption is quite commonly spread, may serve as an illustration of how several other important diseases are spread,—those diseases which enter the body with the air which is inhaled.

Diphtheria is spread by the sputa, in much the same way as consumption. The germs are mainly in the throat.

I have here, for distribution, copies of a four-page leaflet (No. [226]) issued by the State Board of Health, which tells just how each one of the most important diseases is spread, and just how each one may be restricted or prevented. I need not tell you about all of them, because you can read it at your leisure from the leaflets which I trust you will take home with you.

PERSONAL HYGIENE LESS IMPORTANT THAN PUBLIC SANITATION.

There are so many topics, relating directly to the health of the people, with which I might occupy the time at my disposal, that there is great chance for choice of one to place before you. We might well occupy the remaining time in considering the subject of personal hygiene—what each person may do for the preservation of his or her own individual health. But this is a selfish proceeding, and is of much less importance than considering what is for the general good. It seems strange, but I believe it is true that in laboring for the public health we are able to do more for our own selfish interests in life and health than we can possibly do by confining our efforts to personal hygiene and self-preservation. The reason for this is that "Man does not live for himself alone," but for and with others, and whatever affects one individual of a community may affect many individuals. This is particularly true of those diseases which are most destructive to human life; they are, as a rule, communicable from person to person. Formerly such diseases were called "catching," "contagious," or "infectious." Now we speak of them as "communicable."

One main reason why personal hygiene is not of much consequence when compared with public-health work, is because the most destructive

diseases, being communicable diseases, may come to persons who ordinarily are in the most robust health. I have pointed out to you how consumption may be contracted by persons, however good their general health may ordinarily be, if only through some temporary sore throat there is an opportunity for the germs of consumption to lodge and reproduce themselves. I have known of outbreaks of diphtheria in which the disease seemed to attack especially those rosy-cheeked children whose rosy cheeks had been gained by much exercise in the open air. Their throats were sufficiently sensitive to permit the reproduction of the Löffler bacillus, which is the specific cause of diphtheria, and they contracted diphtheria and died.

THE AIR-FILTER FALLACY.

There is a common belief which is erroneous and ought to be corrected. Probably you have recently read, as I have, in a newspaper, of a very expensive residence constructed so as to filter all the air with which it is to be supplied. The idea seems to be that those bacteria which cause disease are commonly floating about in the ordinary atmosphere. This cannot generally be true; except within a few rods of contagious-disease hospitals, or places where persons sick with a communicable disease are present. Even where a consumptive or diphtheritic person has spit upon a sidewalk, the main danger cannot be of inhaling the dust from the sputum while it is in the out-door air; but the danger is that the sputum may adhere to the shoes of some person, or to the bottom of some lady's dress, and be carried into rooms and there rise as dust to be inhaled and thus spread the disease.

To filter the fresh air supply of a residence is of no consequence, if at the same time persons are permitted to enter the residence without disinfecting their clothing and their persons, and especially without disinfecting their pocket handkerchiefs, on which they may carry the germs of diphtheria, tonsillitis, influenza, pneumonia, or consumption, and sometimes more than one of these diseases at the same time.

Whatever may be true relative to the ordinary bacteria, which are widely distributed everywhere, it should be distinctly and clearly understood that the dangerous communicable diseases, such as small-pox, diphtheria, scarlet fever and consumption, are spread, directly and indirectly, from actual cases of those diseases, and that, as a rule, they are not caused by any bacteria in the ordinary atmosphere surrounding our residences.

THE IMPORTANT DISEASES.

Which are the diseases that it is most important that we understand? It must be either those which cause the most sickness, or those which cause the most deaths. Let us first consider those which cause most sickness:

Formerly intermittent fever, commonly called ague, caused more sickness in Michigan than any other disease. Happily that time has now passed; but if all the streams in the State shall come to have dams across them, and ponds to supply water-power for electric-light plants, and the surrounding country have its ground-water rise to near the surface of

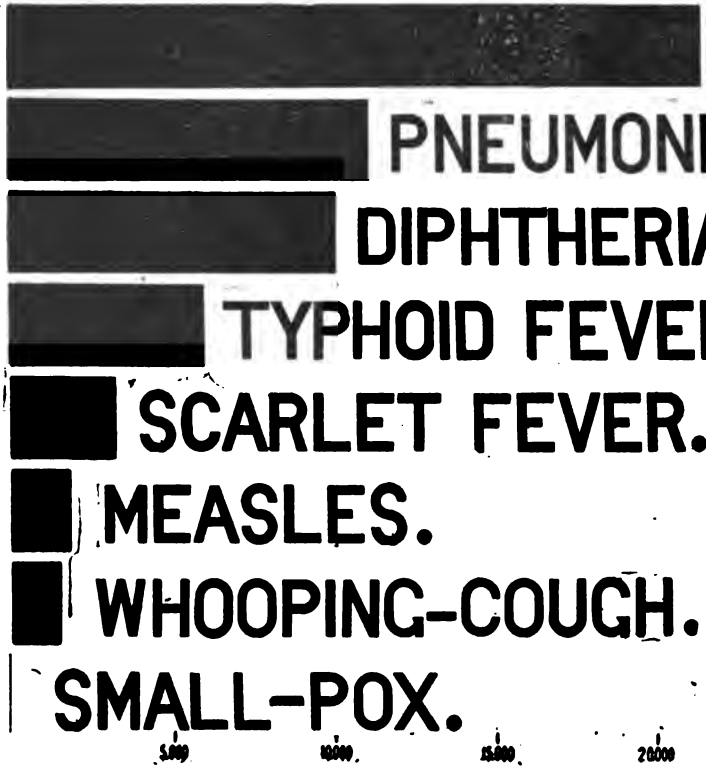
the earth, that disease may again become worthy of consideration. At the present time rheumatism causes more sickness than any other disease. The State Board of Health is investigating, with the hope of some time being able to advise how that sickness can be lessened. Influenza (la grippe) is a disease which seems to be increasing in importance, throughout the world. The State Board of Health has collected and published many classes of facts concerning the causes of influenza. The conditions favoring its increase are probably now worked out and understood. If, as I believe, the increase of the disease is causally associated with the world-wide increase in the use of electricity, and the consequent formation of ozone, some very general effort will need to be undertaken for the lessening of that disease. But I need not say more now than to ask your continued support of the sickness statistics of Michigan which have given us important knowledge of influenza, and of other diseases, and which some time will be essential to the control of those diseases. For our safety, it is important that we understand that man, by clearing land, draining, etc. is constantly changing the face of nature thereby doing away with intermittent fever; by other measures man is, apparently, increasing influenza. These changes need to be closely watched, recorded, and studied in order to guard against the possible rise of some disease which shall sweep off large numbers of our people. This is one reason why we should all coöperate by promptly reporting dangerous diseases to the local health officer, who should promptly report them to the State Board of Health, which should constantly have its finger on the public pulse, and should constantly record and study the sickness statistics and the contagious-disease statistics thus created. This is scientific work, largely for future benefits, but even now beginning to be of practical utility. We already know how to lessen influenza.

DISEASES WHICH CAUSE MOST DEATHS.

The diseases which it is most important that we shall understand are named on the diagram which hangs before you, and copies of which are distributed to you. *The diagram exhibits the relative importance of these diseases. We are living at a time when we absolutely know how to restrict, prevent and stamp out small-pox. If one does not want to have small-pox, all that is needful to prevent it is vaccination, and from time to time re-vaccination. Small-pox has come to be of small consequence, as a cause of deaths in Michigan. Whooping-cough is more important. Measles is still more important. The diagram teaches how important some of those diseases are, but I fear that even with the aid of that diagram most of us fail to appreciate the immense importance of consumption—that "great white plague" which is by far the most destructive disease with which we are all of us threatened. Probably more than one out of every seven of us who are now in this room will die of this disease in some form, and die prematurely, unless there shall soon be thorough coöperation for the prevention of tubercular diseases of man and of animals. When we come to understand, as I have explained to you, how tubercular diseases are sometimes spread, it is easy to see why no person alone can guard against contracting consumption. We are all at the mercy of our fellow beings who are coughing and spitting out the germs

*Printed on page 28.

DEATHS IN MICHIGAN, 10 YEARS, 1884-93.



[PLATE NO. 648]

This diagram is accurately drawn to a scale, and the *relative importance* of each disease, as a cause of deaths in Michigan, during the years specified, is, therefore, correctly shown.

All the diseases mentioned above are believed to be caused by micro-organisms, some of which have been discovered, and drawings of them are here exhibited.

in innumerable numbers. If they can all be taught how to disinfect or destroy their sputa we are comparatively safe. If they all continue to scatter the seeds of consumption in every public hall and place, probably one-seventh of us, or more, will prematurely die of that wasting and lingering disease.

CAN CONSUMPTION BE PREVENTED?

I believe it can be almost entirely prevented. Before vaccination was employed small-pox caused about twice the mortality that consumption now causes. Now, in Michigan, small-pox is almost wholly restricted and prevented. Since the State Board of Health has been laboring for the restriction of scarlet fever the mortality from scarlet fever has been lessened by more than one-half. If the advice of the State Board of Health were accepted and acted upon in every part of Michigan, I believe that scarlet fever would be stamped out, as small-pox has been. In consumption the germs are not all over the surface of the body as they are believed to be in scarlet fever. In consumption they are in excretions which can be disinfected, mainly in the sputa which without much difficulty can be destroyed.

All sputa of every person who coughs should be promptly destroyed. Already

CONSUMPTION IS ON THE DECLINE

in Michigan and in other states where public-health work has been done. I have not yet computed the rate of decline in Michigan, but the secretary of the Massachusetts State Board of Health has computed the rate of decline in his state, and says that at the same rate, if continued, consumption would cease to be a factor in the death-rates in that state in 1950. We ought to be selfish enough to bring this about here before our own generation shall have been needlessly sacrificed to this disease, now known to be preventable. Every one of us can do something in this direction. Man *is* "his brother's keeper." We can all use our influence for the reporting of every case of consumption, for the education of every consumptive so that he will disinfect everything that he infects, for the education of the friends of consumptives so that they shall act for our protection, for the education of all the pupils in our public schools so that they may act for their own safety and for the general safety, as regards consumption and all other dangerous communicable diseases. On this subject "knowledge is power." I do not know of any instruction which can be given in our public schools which equals in importance this knowledge of the ways in which the most dangerous diseases are spread, and the ways whereby those diseases may be restricted and prevented. Such knowledge tends directly and indirectly to the preservation of human life and health. It is such knowledge which that great philosopher Herbert Spencer has declared to be "knowledge of most worth."

Let us all encourage the spreading of such knowledge "of most worth," tending toward the general enjoyment of long, healthy, happy, and useful lives.

WEDNESDAY MORNING, YOUNG MEN'S SESSION.

Prof. Clinton D. Smith, Agricultural College, in the chair.

At the opening of the session the superintendent of institutes had announced that no man would be allowed to take part in the discussions unless under forty-five years of age. On account of the impossibility of determining the age of the gentler sex and to save their veracity, all the ladies in the audience were allowed to take part without regard to age, color or previous condition of servitude.

IMPROVING AND UTILIZING LOW LANDS.

C. B. CHARLES, BANGOR, VAN BUREN CO.

The importance of my subject lies in the fact that so much of our fair State is composed of low, swampy land; that so much of it is yet unimproved, and that the prices of farm crops depend so largely upon the yield of the products raised upon the higher, dryer lands of our country. No one can tell just how much of our State is swamp, for the subject has never yet been considered by our census officers.

There are few farms that do not have more or less swampy places, and few townships that do not have extensive tracts of like nature. I think, after consulting the State authorities, that one will be safe in estimating five millions of acres as the part of our State classed as swamp land.

It is curious to know that one of the early government surveyors said that Michigan was "a land fit only for wolves, wild Indians, mosquitoes, rattlesnakes and ague," and although his discription is not in accordance with developed facts, our swamps and low lands have until recently been considered very much too extensive.

The early settlers invariably shunned these low places, choosing for their homes the higher and usually poorer sections.

Their clearings extended to the swamps and there stopped, as if afraid to venture into the wilderness. They considered the swamps as worthless, and they were without value then, for the labor necessary to reclaim them was worth more than the land; but now we realize that for centuries the hills and high lands have been sending down, with the annual rainfall, their stores of rich fertility to be deposited in these low places, until they have become veritable "Banks of Deposit," on which the owner may *draw* without fear of defaulting president or absconding cashiers.

The question now before us is "how may we best manage these places to get the best results from their long stored fertility?"

THE ESSENTIAL THINGS.

My limited experience shows that *perfect* drainage, *good* seed and *thorough* cultivation, are the key to the whole matter.

Everyone knows a swamp when he sees it and knows too, that muck is made up of vegetable matter that has decayed under water, and that it occurs, in our State, in all the various stages of decomposition, from the mossy kind, that has undergone little or no change, to the black powdery kind that is soft in its character and free from all acid properties.

The mossy kind still shows its original plant structure and will require years, if not ages of time, to decay and be fit for agricultural purposes. Between the two extremes we find the dark *cheesy* muck, that is almost decomposed, but still of a solid, sticky mass, acid in its properties and unsatisfactory as an agricultural soil. Of this middle class we find most of the muck of our State. It can be changed into the better kind *in time* by nature, or with a little help from man by drainage, alkalies or frost, it may soon be converted into the best of soils. The growth of weeds in a swamp is an almost certain indication of the value of the soil for farming purposes. A swamp that will grow rank, thrifty weeds will grow rank, thrifty farm crops of the better sort, and where little or no weeds grow, the land had better be left alone.

DRAINAGE.

The first thing to be done with a swamp is to thoroughly drain off the surplus water to a depth of at least two feet. The necessity for thoroughness in drainage is often overlooked and the swamps are drained just enough to grow crops, perhaps in a dry season, or to get the plants well started in the spring only to be killed by floods later in the season when we have a year like the one just passed. Most swamps have a natural outlet with sufficient fall for thorough drainage. A large open main ditch through the lowest place with smaller lateral drains twenty or forty rods apart, extending to the high land, will usually prove sufficient (where the swamp is not springy), if kept open and free from all rubbish. The water must escape readily and rapidly in time of flood, for standing water for even a short time in sunshiny weather will often blast the hopes of a whole season. Many advocate tile drainage, as the banks of open ditches are a harbor for weeds and insects, are unsightly, and a waste of land, but owing to the unequal settling of the muck they often prove unsatisfactory and expensive. Usually the stumps and roots are all removed when the swamp is prepared for use and we have a perfect field the first season, and then with sharp steel tools the ground can be prepared for crops in first-class order. When the ground is soft or miry, it becomes necessary to shoe the horse or team with "muck shoes," made of wood or iron. Wooden boards, eight by ten inches in size, or larger if the ground is very soft, fastened to the feet of the horses by iron clamps or wires, have been found very cheap and very satisfactory to the horse as well as to the driver. They are easily put on or removed and are a contrivance that any one can make or any horse

can wear. As the soil becomes more compact the muck shoes may be gradually discarded.

SEED.

It is very essential that the seed be vigorous and strong, that it may be able to do its best from the start. This is true on all kinds of land, but more especially on black soils that get so warm in the day and so cold at night.

CULTIVATION.

It is needless to say that much depends upon the thorough cultivation of the crops growing upon low land. Muck must be often stirred, weeds or no weeds, and I often think it a kind Providence that gave us the weeds to compel us to cultivate. The work should be done often to break crust that forms on the surface after every rainfall. Most hoed crops may be cultivated with a horse, and shallow culture will prove most satisfactory.

Muck is very light, loose and friable, and is very easy to cultivate. On sunshiny days weeds are easily killed when disturbed and with a "scuffle hoe," sharp on both edges, one can easily hoe half an acre of onions or vegetables where the rows are not closer than eighteen inches. Weeds as well as better plants grow very fast on muck soil and a delay of even a day or two in wet weather will cause the *truck* grower many a day of hard labor to catch up with his growing crop.

The swamp is surely no place for a lazy man, and only live, energetic men can hope to succeed on soil so rich.

FERTILIZERS.

After several rank crops have been removed, one or more of the elements necessary to plant growth seem to become exhausted and it becomes necessary to supply the deficiency. To determine just what elements are needed samples of muck were analyzed from fields of different ages and compared with *new* muck, and various experiments with fertilizers were made both at the Agricultural College and near McDonald, Mich. The details of this experiment are published in full in "Michigan Board of Agriculture," 1895, page 115.

MY CONCLUSIONS

derived from this experiment are:

1st. Barnyard manure seems to be the most perfect fertilizer and where obtainable is all that is necessary.

2d. Potash seems to be the element lacking—both as determined by the chemist by analyzing the soil, and by the result of the experiment.

3d. Any fertilizer is better than none, and other experiments show that small amounts of fertilizers produce results on swamp land that would not be noticed on higher lands.

KIND OF CROPS.

The kind of crops one should raise on low land depends largely upon the market and nearness to a shipping point. If far from market the mint crop seems to be very desirable and often very profitable. While for the swamp farm near a good market the various root crops as potatoes, carrots, parsnips, and beets often pay well for the labor expended. Most of the staple grain crops do well, notably so do corn, rye, barley and oats, and they often produce mammoth crops.

The grasses are at home on muck soil and when the hay crop is not wanted, or has "run out," as pasture land muck sod has no equal.

Horse radish grows long, straight roots on well drained muck and during the last few years most of the celery, onions and cabbage of our famous State has been raised on the once worthless swamp land.

In fact, most farm products except fruits do well and the swamp is fast forcing itself to the front as a factor in the economy of our nation. The price of farm crops, we are told, depends on the "supply and demand," and the supply depends largely upon the crop raised upon high land because most of the soil cultivated is of that kind.

Anything that reduces the crop tends to raise the price, and often the crop raised upon the swamp is largest when the same crop on higher land is smallest and the prices highest. This fact alone makes the cultivation of low land very satisfactory and the farmer can overlook the danger from frosts, insects and floods.

Our swamps and waste lands are fast being improved, and the time is rapidly approaching when they will all "blossom as the rose" and help to make our State, not ninth in population and fifth in wealth, but *first* in all things.

DISCUSSION.

Mr. Brundage: Your potash salts and ashes both produced good results. How did they pay?

Mr. Charles: We found the ashes fully equal to the potash salts.

Q. Why does barnyard manure show such good results when there is already so much vegetable matter present?

Mr. Charles: I don't know.

C. D. Smith: The barn yard manure renders available the plant food required in the muck by supplying the bacteria interested in its decomposition. While it seems wasteful to add long manure to muck lands it does seem to improve them, and undoubtedly for the reason mentioned.

Mr. Long: How does horse radish do on reclaimed muck, and how do you exterminate it when you want to do so?

C. B. Charles: I surround the patch set out to horse radish with a ditch, thus confining the roots to the desired locality. I may say that horse radish is a very profitable crop. The roots are clean and smooth when grown on muck, and when sold by the barrel always bring a good price.

Mr. Stewart: Do you use tile drains in muck lands?

Mr. Charles: I find tile drains practical in muck where it has a stiff sub-soil to support the tile. When laid in muck itself it very often settles, thus throwing the tiles out of line.

Q. Was not the frosty portion of the field the lowest?

C. B. Charles: I can hardly say. The water runs both ways, north and south. There is not much difference in the level.

Mr. Long: How deep was the muck?

C. B. Charles: We find the best corn on the shallowest muck, but this is true in a general way only, and the rule has a great many exceptions; in fact, where the very best corn grew the muck was the deepest. It is hard, therefore, to give a general rule.

Mr. Welch: Was not the killing by the frost due to a difference in the density of the corn?

C. B. Charles: No; while one plot in the part of the field least affected by the frost was good the one next to it was the poorest in the whole field. As stated in the paper the corn planted a day later was much worse frosted that the first planting.

Mr. Knapp: Is it bad policy to burn off the top of the muck?

C. B. Charles: Yes, it is. Whatever is burned is practically wasted, and I do not believe it to be a good policy to burn off the surface muck.

Mr. Brundage: Did the corn do as well after it was frosted as the other part of the field?

C. B. Charles: The corn where barn yard manure was applied produced the best ears, notwithstanding the frosts; where the ears had set they continued to grow after the frosts, but where the ears were not set the crop was ruined by it.

A. B. Cook: Does not drainage increase danger by fire? Do you not burn the rubbish as you clean off the muck?

C. B. Charles: No, we keep the fire out of the muck field after the ground thaws in the spring; we allow no fire there when there is danger of the muck burning.

C. B. Cook: Is there not danger of the muck washing by the heavy rains?

C. B. Charles: No, I have had no trouble from this source although I use surface ditches.

J. N. Stearns: As you all know the muck beds about Kalamazoo are largely devoted to celery. Here they have found it necessary to add large quantities of barn yard manure, not so much, perhaps, for the plant food as for the necessary microbes to make the plant food available.

Dr. R. C. Kedzie: As has already been said barn yard manure is valuable to swamp land because it acts as a ferment and makes the elements in the muck available. While there is much nitrogen present it is in a form not available to the plants until acted upon by the microbes furnished by the barn yard manure. If the muck is acid it should be exposed to the action of the frosts and lime, coal ashes, or barn yard manure, or all three of them added.

Marl, when subjected to frosts, is as good as when burned; potash in wood ashes is in the form of the carbonate and is more available than when in the form of Stassfurt salts. The muck in the cranberry swamps is neutral. Useless muck or sour muck may contain an acidity equivalent to one and one-half per cent of acetic acid; in such a case lime, wood ashes, leached ashes, are called for.

Mr. Bartlett of Pontiac sang.

MAKING BUTTER IN A DAIRY OF LESS THAN FIVE COWS.

G. H. TRUE, AGRICULTURAL COLLEGE.

If I were to speak this afternoon to all the butter makers of the State who make butter from herds of less than five cows, I think I would speak to over ninety per cent of all who make butter. There are on an average less than three cows per farm in Michigan, and as ninety-five per cent of the butter made in the State is made upon the farm, it is safe to assume that ninety per cent of the butter makers are making butter from herds of less than five cows.

While the little butter money has come in handy during the hard year past, I feel that the tired back and aching limbs of many a farmer's wife have borne silent testimony to the fact that butter making upon the farm does not pay. Even leaving out the work of making, one of the most expensive items in the list, which shows us the cost of a pound of butter, it is hard to figure any profit into making butter which must be sold at twelve cents a pound. I cannot do it. And though I have no figures to prove it, I believe that fully half of the butter made on the farms of Michigan is sold at an average of not much above that price.

Now instead of telling how to make good butter and thus remedy this difficulty, I want to suggest a few points which have their bearing on, but are not a part of, the process of butter making.

THE CREAMERY.

In the first place don't ask your wife to make the butter, she has enough to do without that. During the last few years when so many things have been done or discovered to improve the various products of labor and cheapen their cost, improvements in the art of butter making have taken their place with the rest. Creameries have sprung up, the farmers coöperate, and a hundred and fifty or two hundred farmers send their milk to the one creamery where the work is all done by say three men working for an average of perhaps fifty dollars a month each, and a part of the burden is lifted from a hundred and fifty pairs of tired shoulders in as many different farm houses. A hundred and fifty dollars a month for one hundred and fifty farmers means a dollar apiece. Did you ever think of it, that a dollar a month would take all the hard work and care of butter making out of your home?

But what other advantages would be derived from sending your milk to a creamery? In the first place there would be at least seven pounds more butter made out of every thousand pounds of milk you sent to the creamery than you are getting out of it at home. If you have four cows that give 3,350 pounds of milk a year, which is about the average for Michigan cows, that would be ninety pounds of butter. Then not only this ninety pounds of butter, but all the butter made from your milk, would sell for at least five cents per pound more than you are probably getting for it at the store.

IMPROVE THE HERD.

But there is one more advantage to be derived from sending your milk to the creamery which suggests the next point to be spoken of, the improvement of the herd. The milk which you deliver to the factory is weighed every day and tested once a week, and you will learn what you have not taken the trouble to find out for yourself, how much milk and butter your cows are giving, and these two items will come to be of great interest to you. You will not be satisfied till you know which of your cows are giving the most butter, and as a result of your finding out you will soon have some cows for sale and you will soon have a better herd.

Ex-Gov. Hoard says that the recent low prices of butter are a blessing to the dairymen as they have been forced to weed out the poor cows. If this is so with the intelligent men who know what the individual cows of their herds are doing, how about those who do not know and still keep the poor cows? If we are to believe the farm statistics of Michigan, the average dairy cow in the State is kept at an actual loss to her owner. Now I know of some that are paying handsome profits, some therefore must be woefully expensive luxuries to their unsuspecting owners.

The difficulty is there is not one man in a hundred who knows what his cows are doing in the way of milk or butter production. So I want to say right here, whether you send your milk to a creamery or not, don't go another week without knowing whether or not you're paying their board.

I have tested the milk of two herds of cows on adjoining farms. In one herd where the milk had never been weighed or tested, twelve head averaged 14 pounds of milk a day that tested 2.8 per cent butter fat, or a little less than a half a pound of butter. In the other the scales and Babcock test were in daily use; this herd averaged 28 pounds of milk a day containing 3.8 per cent of butter fat, or about a pound and a quarter of butter fat a day. This is a fair illustration of the difference between knowing and not knowing what you are doing.

HAVE A SEPARATE DAIRY ROOM.

If you cannot send your milk to the creamery, have a suitable place to handle your milk and butter at home. Don't try to use the pantry and kitchen, it doesn't pay, and I don't need to suggest the reasons why. Milk must be handled in a room that is not only clean and pure itself, but in which the atmosphere is pure as well. If you can't do any better, do as we have had to do at the College, fix a room in the cellar. And don't get the idea that you must have expensive apparatus. A separator is a good thing, but it would require four exceptionally good cows to make its use profitable. You don't even need an expensive creamer for setting your milk, though creamers are certainly a great convenience. A plain wooden tank lined with galvanized iron, and the ordinary shot gun cans, make a very suitable creamer for cold deep setting.

I would have an improved churn. That is an ordinary barrel, box or swing churn, some churn without any inside contrivance. I would not

use a dash churn. I would also have a butter worker, the plain triangular butter worker with a lever, there is none better. Then there is the hair sieve, through which we draw off the butter milk from the churn, a little thing, but a great convenience.

I would also have a neat butter mould or print which left the butter in cakes convenient for wrapping in parchment paper and every cake should be neatly wrapped, and somewhere, either on the butter or on the paper or package, I should have my name or trade mark. I shall be glad when we have a law compelling everyone to label everything he puts on the market, be it butter, cheese, or a threshing machine. We will have more good butter in those days.

ICE.

Don't try to get along without ice, you can't afford to do it. The successful butter maker today is the man who understands how to control the fermentation in his milk and cream, and this cannot be done without his being able to regulate the temperature. At the College I am told it costs about ten cents a ton to put up ice. Mr. Welch says he can buy his ice, draw it a mile and a half, and put it up for forty cents a ton. I think we use about twelve tons of ice a year, from which I estimate that ten dollars ought to pay for ice enough to last the average man with a herd of five cows a year, and a building could be put up to hold this amount at a cost of from ten dollars up for lumber, and the building would last for years.

So in conclusion, let us send our milk to the creamery if we can; if we cannot, let us have a separate dairy room at home and suitable appliance for doing the work well, then if we understand the cows and the cows understand us, I think we will agree with the hundreds of farmers in Wisconsin, Iowa, and Minnesota, whose prosperity affirms that making butter from a small herd of cows does pay.

DISCUSSION.

LED BY J. H. BROWN.

The first requisite of dairying is thorough cleanliness. It is also of prime importance that good cows be obtained. It does not pay to keep poor cows. Keep weeding them out. All above a certain amount produced by a cow is clear profit. If she does not produce up to and above that point she is unprofitable.

Get a good sire. Do not always stop at a big price, for good things generally cost something.

Feed and environment must also be considered. The cow should use just enough food to keep the system in good working order and put the rest in the pail. Wrong feeding produces a shrinkage in the milk pail. Flies, or an injudicious use of dogs, annoy and irritate cows and affect the milking qualities. So do ice cold water in winter, lice and other parasites. Feed and treatment are as important as breed. Kindness

pays, for anything which annoys and angers the animal affects its product.

Looking after the details is the secret of good dairying. If farmers looked after their farms as great business men do after their business, results would often be remarkable. There has been much waste on the farms. A farmer should look after the little things with the most careful thoroughness. Ensilage is excellent for feeding cows, and is economical if ten or more cows are kept. For a smaller number it is rather costly. Cut feed is good, if properly chosen, prepared and fed out. Roots in winter are good for succulence, as cows then become constipated, a condition which does not menace them in summer. Roots are good principally for this reason, and so is oil meal.

The normal temperature of a cow is little higher than our own. She drinks large quantities of water. Therefore, if she has ice water, it reduces the temperature of the stomach, and she then uses some of the food you give her to bring it to the normal temperature again. She is doing so at your expense. A tank heater with a coil of pipe in it is excellent for warming water for stock. Such a tank is inexpensive and effective.

Corn and cobs ground together have some value as food. There is but little nourishment in a cob, but the particles separate the corn meal in the stomach and thus aid digestion. Keeping salt constantly before cows is a good thing, and where they have it within reach they will not as a rule take too much. Dehorning I think "all right and all wrong." It depends on circumstances. It might be well to dehorn a vicious, "cantankerous" animal. Such an animal will annoy other cattle. I once sawed off the horns of such an animal and felt mean about it, but later had occasion to treat similar animals the same way. A very vicious animal is a menace. I do not think dehorning with a clipper is as cruel as many suppose. The act is instantaneous, and the pain not of long duration. In my opinion the cream separators are profitable only for ten cows or more. Results from the deep-setting system are about as good and not as costly. Some claimed a separator would make money for a man who kept but half a cow, but such advocates usually had separators to sell.

The temperature of the water and milk in the deep-setting system is important. The water around the can should be cold when the milk is poured in. Let the milk stand until all the cream has arisen, and keep the cream fresh until churned. The cream under usual conditions all rises in about 12 hours.

E. A. Croman, Grass Lake: Before improving our methods we had traded butter out at the groceries for from ten to fifteen cents per pound. After taking *Hoard's Dairyman* and reading up on the subject we bought a barrel churn, a thermometer, and other improved apparatus, and made our butter to conform to the wants of our customers. We made, salted, and packed it to suit their taste. A relative in Detroit is a commission merchant and worked up a trade for us. We used five and ten pound paper packages, also crocks. Our first returns were fifteen cents a pound and later the price raised to twenty-five cents a pound, and now all of our butter is sold by the year at that figure. We churn at 52 degrees usually, and work it about two degrees warmer. We know

when it is worked enough by breaking off a piece, and noticing the condition of the fracture, the butter should stand out in points.

Mr. Doane: Can we get such prices now as twenty-five cents?

Mr. Croman: Yes:

C. D. Smith: The reason why oleomargarine is sold in the State as well as the reason why the butter prices are on the average so low is that in other counties of the State than Gratiot a lot of poor butter is made; butter white in color, strong in odor, acid to the taste, and containing a mixture of grease and other materials too nauseous to describe.

Mr. Welch: Do we get more or less cream in bulk by cooling rapidly?

Mr. True: Rapid cooling makes more exhaustive creaming, that is, it leaves less fat in the skim milk. Moreover when milk is cooled rapidly, set in deep cans, the bulk of the cream is greater at the end of 12 hours than at the end of 24 hours. Hence in cold deep setting we vary the bulk of the cream at will.

Mr. Vanderscoten: Do we get the same quantity of cream from pan setting that we do from deep setting?

Mr. True: We get thinner cream from the deep setting.

Q. Can we make as good butter from milk set in pans as from deep setting?

Mr. True: No; as generally managed you cannot.

E. A. Croman: The trouble with shallow pans is generally that they are not skimmed at the right time. Another thing about shallow pans is that it makes a great deal of washing of tinware. Besides the pantry has to be kept free from odors and at an even temperature.

C. D. Smith: My objection to setting milk in shallow pans arises from the fact that for the same quantity of milk more work is required with the pans than with cans, and more skill in their manipulation. In all dairy sections of this State and elsewhere the shallow pans are giving way first to deep setting, and secondly, as the dairies increase in size, to the hand and steam separator.

Q. What size cans should be used?

Mr. True: About eight inches in diameter and twenty inches deep.

WEDNESDAY AFTERNOON.

Hon. C. W. Garfield, of Grand Rapids, in the chair.

QUESTION BOX.

Q. Would it be economical to carry the supply pipe to the cabinet creamery under the ice house and allow a constant stream thus cooled to flow into the creamery?

Mr. True: I don't know. But if the ice is going to melt anyway you will get the advantage of the cold from such melting. The warm water running under the ice will certainly melt the lower layer.

Q. How long after milk is taken from the cow ought it to stand in the pail before straining?

Mr. True: It should be strained at once. Do not wait until you have accumulated two or three pails full in the stable before carrying them to the milk house. Strain, if possible, milk of each cow as soon as it is milked.

Q. Is ice cold silage good for milch cows?

A. M. Welch: I prefer not to have it ice cold. Cows will eat silage in any shape, but it ought not to be frozen or too cold.

Q. Is cob meal good?

J. H. Brown: The principal benefit of cob meal is to hold the particles of corn meal apart and allow the juices of the stomach to permeate the mass. Chemical analysis shows that pound for pound it is not more valuable than oat straw.

Q. What causes white specks in the butter?

Mr. True: By white specks in the butter I suppose are meant the small white particles often found there and not the streaks. Now these white specks are usually from curdling of the milk mixed with the cream or from hardened bits of cream. They may be partially removed at least by not drawing off all of the butter milk before adding a large quantity of water. In that case the butter will float on the surface of the water and the white specks sink to the bottom and can be drawn off. A better way is to prevent the formation of these white specks by not allowing the cream to become over ripe or loppered.

Q. Does the food of the cow affect the flavor of the butter? Please give a direct answer, yes or no?

Mr. True: Yes.

Q. Is there any profit in keeping cows on the farm at the present prices of butter?

Mr. E. A. Croman: No sir; not at store prices.

Q. How many cows do you milk this winter, Mr. J. H. Brown?

Mr. Brown: Eleven to sixteen.

Q. What is the best forage plant for cattle?

Mr. Brown: Corn by all means.

Q. Does Mr. Charles mean to say that we cannot safely lay tile in muck?

C. B. Charles: By no means, we may safely lay them in muck and they will work for several years. Besides it does not cost much to relay them if they do get out of place. The digging is very easy and cheap.

Q. What breed of cows do you recommend?

Prof. Smith: A good cow is a good cow, no matter to what breed she belongs, and all breeds have some good cows. If you are going into high class butter making alone I would recommend either the Jersey or Guernsey. If the quantity of milk is an object I would try the Holstein. If the old fashioned Shorthorn, that kind with great big udders, had been selected and bred for milk giving with the same skill that was shown in their selection for beef purposes, we would have had but little use in these days for either the Channel Island or Netherland breeds.

Q. If you have sour muck land would it not be beneficial to burn it over, providing it would not thereby become too low to drain?

Mr. Charles: I do not think that this is the best way to remedy the difficulty. It is both dangerous and wasteful.

Dr. Kedzie: I agree with Mr. Charles; burning swamp lands to cure sourness or barrenness is like getting rid of a hornet's nest by burning the barn in which it is built.

Q. What grasses should be sown on new muck land for permanent pasture?

Mr. Charles: I would raise something else before trying to seed muck down and then would try timothy.

Q. Would you work butter twice? if so, how long would you let it stand between times?

Mr. True: Yes. Let there be two or three hours or more between working.

Q. Under equal conditions would not the plot treated with barn yard manure have given the largest yield in your experiment?

Mr. Charles: Yes.

Q. Should not the sale of oleomargarine as butter be prohibited by law?

K. L. Butterfield: I think it should be. In some states it is now prohibited and I can see no excuse for the sale of oleo as butter. It may be sold as oleo, but should not be colored to resemble butter. The fraud comes in solely when the oleo is sold for something which it is not.

Q. Which is the better policy for the average farmer, to make butter on the farm or sell his cream to a creamery?

Prof. Smith: If the creamery is well managed it should be patronized by every farmer in the vicinity, who should keep, not one cow, but a dozen. Remove the drudgery of the butter making from the household and concentrate it in the factory, thereby giving a more uniform and higher priced product with less labor and expense.

Q. Would not a cheese factory pay better than a creamery?

Mr. True: It may or it may not, generally it is about an even thing. In reckoning with a creamery don't forget the value of the skim milk, which is worth for stock feeding about twenty cents a hundred.

Q. What kind of a power is most practical and economical for an average farm with a small dairy? A horse tread-power?

Mr. Brown: I have used a tread power on my farm for two years and like it very much. The speed can be regulated by the governor so that it will be very even. I use it for separating and for grinding. No engineer required. I unhesitatingly recommend the tread power.

C. S. Bartlett: On a dairy farm I like better a steam power because the steam can then be used for other purposes like washing the utensils, heating water, and other purposes.

A. B. Cook: On the hundred and sixty acres which I am trying to manage we have used the tread power for ten years and that almost without the need of repairs and with little or no expense. As far as I can see it is good for ten years more, although we have cut on the average thirty acres of silage yearly. I like it better than steam because in the first place there is no danger connected with it; it requires no fuel; in the winter there is not only no cost for power for cutting stalks or straw, but the horses are actually better for the exercise. It requires two good, heavy, twelve hundred pound horses to cut silage. They do not furnish enough power, however, for grinding. It will require but two horses on a tread power to do as much work as three on the sweep.

Q. Does not such work hurt the horses' legs?

A. B. Cook: I have noticed that the horses act a little queer just after they step off the power. I do not believe that the work is any harder than any ordinary hard work.

Mr. Brown: If you want to get the limit of power from your horses you must harness them and hitch them to the rear beam of the power; in this way your two horses will do the work of four on a sweep. You must be careful to have the bridge up to the power long enough so that there will not be an abrupt step.

Q. How long will cream keep sweet in a refrigerator and not get bitter?

Mr. Croman: Four days, if the milk has been kept clean and free from bad odors.

Q. Is it not a fact that salt is a good thing for muck land?

Dr. Kedzie: No.

Q. Will Mr. Charles please explain the method of growing peppermint on muck soil and the profit?

Mr. Charles: I have not had much experience in the growing of peppermint, but it seems now to be the only crop that can be grown at a profit. If you want to introduce it in this or any other locality, do it gradually; buy a few roots and plant a few square rods. In this way grow roots enough to plant a larger area. The method of growing is not intricate. The roots are scattered along a furrow and plowed under, not too deep. The weeds are then kept down until the peppermint plants cover the ground. They are harvested usually with a scythe and after slightly wilting are carried to a distillery. The average yield of oil per acre is about thirty pounds, worth about thirty dollars, while the cost per acre is from five to seven dollars.

Q. Has anyone tried draining swamps by wells?

Dr. Kedzie: Yes, where the swamp lies on a saucer shaped subsoil of clay or other impervious material, below which there is a gravel bed, it is but necessary to bore a hole in the center of the swamp to which the drains may be led. This method has been repeatedly and successfully adopted.

W. C. Stewart: My neighbor in Newaygo county has drained a swamp according to this method with good success. He drove down a tubular well deep enough to strike a vein of gravel. He then cut off the tube low enough down to drain the swamp and put a screen over the other end.

Q. What is the difference in feeding value between shredded corn fodder and silage?

Mr. Brown: In the first place the silage contains nearly all the food elements that existed in the original corn, no more and but little less. If the corn fodder has been properly cured it also contains the food elements existing in it at the time it was cut. If, by shredded corn fodder, you mean ears and all, the difference between it and silage lies largely in the palatability. In this silage has the advantage. Besides silage is eaten up much cleaner.

Q. Is the new churn that works on the vacuum principle an acquisition?

Mr. True: It is not, as far as we have tried. We still recommend the old barrel churn.

Q. Is it advisable for the common farmer to buy and use a creamer with ice?

Mr. True: Yes, I think so; ice is not expensive. I would build a tank of galvanized iron surrounded by two inch plank and in that would use shot gun cans.

Mr. Brown: A lady at Paw Paw had been using shallow pans and adopted the deep cans, using a half barrel to hold the ice and water. Whereas she had been troubled with white caps in the butter before she was not bothered by them afterward.

Song by Mr. C. S. Bartlett, of Pontiac.

RECENT PROGRESS IN STOCK FEEDING.

PROF. CLINTON D. SMTH, AGRICULTURAL COLLEGE.

When we compare the stock feeders of the present day with the leaders in that vocation in former times, when we stand our American stock growers alongside of Robert Bakewell, the Collins brothers, the Sage of Sittyton or the founders of those English breeds, we are compelled to say that as far as skill is concerned it is doubtful whether we have any better feeders today than the world had half a century ago. Then, however, this knowledge was confined to the comparative few, the great mass of the farmers were blind and ignorant followers, if they moved at all. The recent progress in stock feeding has been mainly along the line of bringing the common people up to the level of the leaders, the dissemination of knowledge and the cultivation of skill among a multitude of feeders.

We notice first the spread of a vastly greater skill in selecting foundation stock and breeding the herd for the single purpose at which it is directed. In dairy work the recognition of the significance of the form of the animal as indicating the purpose for which it is adapted, the sale of the tens of thousands of the Babcock tests to corroborate the testi-

mony of the hand and eye in sorting out the cows that should be kept for milk and condemning the others to the slaughter pen, have been long strides in advance in bringing the dairy business to a paying basis even in these times of depression and have marked distinct and rapid progress in the general education of the farmers.

BREEDING TO THE IDEAL.

Driven by necessity we have learned that it is folly to breed horses without having in our mind's eye, clear cut and well defined, the image of the horse that will bring us the most money and then carefully working out that image in our breeding. Breeding horses hit or miss without following a definite line can lead but to disaster, and the great bulk of Michigan farmers are finding this out. The style of horse which the market demands and for which the highest prices are paid are animals with style, good carriage, high headed with arched neck, good weight, hard boned, and good motion. Twelve hundred pound horses and upwards of this type will always sell for good money, while the plug and chuck go begging for a purchaser.

So in sheep, the Michigan farmer is learning more and more to carefully select his breeding stock with a definite purpose. In hogs, also, we have made rapid progress in skill in selecting hogs that yield more bacon per pound of feed consumed and less lard.

Looking along the whole line we see recently a marked progress in the adaptability of farmers to change circumstances and the acquisition of greater skill in the selection of animals.

MODERN FEEDING.

We note, secondly, recent progress in the selection and preparation of feeding stuffs, for our more carefully selected animals. Science is experience classified and boiled down. Science is not synonymous with book knowledge, nor is it confined to the select few who have been through college. Every man who observes and reasons is a scientist.

Man is an animal and his body is subject to the same laws that govern the bodies of domestic animals. He has learned by instinct to so combine the articles which he eats as to develop a healthy body. On his daily bill of fare he may be supposed to classify his food into four classes. In the first come lean meat, cheese, and eggs. Under ordinary circumstances he would not think of making out a meal on either one of these alone, or if one were furnished, calling for the others to round out his meal. He would rather call for an article of the second class, namely, potatoes, vegetables of all kinds or, perhaps, some article intermediate between these two classes and partaking of the nature of both, like bread or milk, which, for our purpose, we may call the third class of food materials; finally, we should feel the want of some kind of fat either in the form of butter or gravy, and would want the fourth class, in which would be placed all forms of grease.

ANIMALS CHOOSE THEIR FOOD.

Now, it seems to me reasonable, that the cow or horse instinctively classifies her bill of fare in the same way. In the first class, where we as human beings place meat, cheese and eggs, the animal places peas, beans, buckwheat middlings, oil meal, and cotton seed meal. The cow can't make a good, full, healthy meal out of any of these materials alone, they are all too rich, she wants something to eat with them just as the man did who had meat, cheese, or eggs. The cow, however, instead of calling for potatoes or other vegetables, would be glad of something in her second class like straw, corn stalks, timothy hay. To her taste these mix in all right with the rich oil meal and feeds of that list. If she cannot get the feeds of the second class she will take by preference the feeds of the third class corresponding to our bread, viz., clover hay, oats and peas, wheat bran, corn meal, oats, and barley, which combine the qualities of the other two classes of feeding stuffs. While pigs may be able to digest and assimilate fat in large proportion in their feed, our other domestic animals cannot and we do not have to butter their bread to make them eat it or cover it with gravy.

Now granting that the division of feeding stuffs into classes as just indicated is logical and inevitable and that the skill of the feeder is directed toward the proper combination of the feeding stuffs, remembering their peculiarities and the class to which each belongs, we have still to remember that altogether independent of this consideration we must recognize the special adaptability of certain foods to certain uses. For example, the chemical composition alone does not explain fully why oats and a little timothy hay serve so well the driving horse, or why clover hay is so peculiarly the feeding stuff for dairy cows, or why corn and clover hay form the best ration for the fattening lamb. Palatability has something to do with it, but does not fully explain. There is a mystery enshrouding the whole subject that will require in the future persistent experimentation and study as thorough and arduous as has been given to it in the past.

FEEDING TABLES AND STANDARDS.

The combined study of the practical feeder and the experimentalist has resulted in the publication of certain tables giving the chemical composition of all of our common feeding stuffs. Space does not permit the publication of such a table here but one can readily be obtained by simply writing to the experiment station at the College. Such tables show the reasons why certain combinations of food are effective while certain others are not tolerated. A table showing the content of digestible nutrients ought to be in the hands of every intelligent stock feeder in the State and our farther steps in advance will be first along the lines of a greater recognition of what the chemist can do and has done for us in giving a clearer insight into the nature of feeding stuffs. We note in the third and last place that progress has been made in a wide dissemination of knowledge in regard to the proper hygienic conditions of our stables and sheds.

The presence of one insidious foe has been revealed to us by the use of tuberculin and we have lately found the reason why fresh air and plenty of sunlight are so essential to a healthy stable. We have found that there is nothing more fatal to noxious germs than clear sunlight and that the successful cattle feeder cannot expect success unless he so arranges his stable that the entire floor space will be flooded with this germ destroyer every cloudless day in the year.

Again we have found that while a dairy herd may for a time give phenomenal yields under high pressure and continual confinement, for the general farmer profit lies along the lines of daily exercise in the open air on all except the coldest days in winter.

DISCUSSION.

A. M. Welch, Ionia: We have made progress in the recent years in paying more attention to the selection of our stock. In cattle the division into dairy and beef types has become marked recently and is destined to become more so. A Jersey steer was fed against a Shorthorn heifer according to practically the same method, with the result that while the heifer gained satisfactorily on the given ration the steer made no gain at all; showing the necessity of having an animal whose ancestors had been bred for the special purpose for many generations. Every sheep feeder recognizes the advantage of having his feeding flock made up of animals of the mutton type.

With us in Ionia county clover hay has almost entirely disappeared, and silage has come to take its place as far as it can. I had the honor of building the first silo in Ionia county. There are 24 there now. Nine were built last year. The silage is used not only for feeding dairy cows but for feeding lambs. It is worthy of note that it is lambs that are being fed in these days and not wethers. We have found that the young lambs put on more gain from the food consumed than do the old sheep. For five years I have used silage for sheep with the very best results. I buy a good class of lambs in the fall, feed them high and sell them at Christmas. I then fill the barn again in January, getting often the cull lambs which other feeders have rejected. On one occasion I put into my barn the 24th of January 300 of these cull lambs which weighed on the average 49.5 pounds. These lambs sheared me at the outset four and one-half pounds of wool. I fed them silage and grain, giving them each three and one-half pounds of silage, one pound of corn and bran in the morning, and bean fodder or straw at noon, with cull beans at night at the rate of one-half to a quarter of a pound per lamb. On such feed by the 15th of May the lambs weighed 72 pounds apiece and had made their gains at a cost of three cents a pound.

My ration for cows, of which I keep a good many to supply milk to the city of Ionia, is 35 pounds of silage, 9 pounds of corn stover, 9 pounds of corn bran mixed in equal proportions, and 16 pounds of sugar beets. In addition they have some oat and pea hay and corn stalks. It is my constant observation that cattle do not like corn stalks as well as they do silage, and that both corn stalks and corn fodder should be fed early in the winter.

Wm. Ball, Hamburg: While a silo may be and undoubtedly is a good thing, there are but few of us that have one. Most of us do not. Neither have we scales and all the paraphernalia for determining accurately the amount we feed and the gains our animals make. We can, however, watch our business closely enough to get a general idea of the line of farming we want to pursue, the successes we make or the failures. My experience has led me to adopt certain rules of procedure, among which I may mention the following:

First, Select your animals for a purpose; this is absolutely essential to success;

Second, Use the appliances needed;

Third, Understand the animal being fed, both as to its wants and the kind of food which can best supply them;

Fourth, Prepare during the preceding season for the winter feeding. Plan your farm work so that the needed fodder will be grown and the needed grain food.

It is the judgment of the feeder that determines the success of the feeding. Constant watchfulness, noting every detail, seeing that the animal consumes all of the food given it, and yet has enough. Good judgment in all these details is necessary to success.

While for the dairy not so much corn meal may be needed, we must recognize in the corn the best food on the farm. With the corn must be fed some hay and possibly some other kind of grain—corn, oats, roots, and wheat bran are all good feeds. The farmer should take into account the value of each and feed in the direction he wants results. If it be pigs he should feed them as quickly as possible, with cows and sheep there are other considerations to be taken into account. The rule ought to be to perfect every animal before killing.

As to fine wool lambs, if you feed them well you can make as good gains as with Cotswolds. They will not make the same price as the medium wool, but when the wool is taken into consideration perhaps the profits will be as great.

E. A. Croman: I can get as much money for fine wool lambs as for coarse wool ones; the profit is a question of the feed rather than the breed.

J. M. Stone, of Vermont: What are the causes and remedies for grub in the back?

Wm. Ball: My cattle have not been bothered with them in late years; they usually come with western cattle. I don't know of any way to get rid of them except to squeeze them out when they are fully grown.

L. Dailey: In speaking of selecting stock for breeding it is my opinion that good toppy horses with good style and action always sell well.

Q. How do you get such horses to sell?

A. By breeding heavy mares weighing twelve hundred pounds each to good Hambletonian stock.

C. E. Vandeventer: I prefer the French coach to the Hambletonian; they are high steppers with good form and the colts are heavier and more stylish.

Mr. Abbott: Is not sweet corn a good fodder?

Prof. Smith: Most excellent; bran may be fed with it with good results.

Mr. Bush: How about peas and oats?

Prof. Smith: Sow the peas early in the spring, using fully two bushels per acre on well prepared ground; plow them under four inches deep; harrow the surface; sow one bushel of oats per acre; harvest when the peas are big enough for table use, cure carefully and the hay is almost equal to clover.

Mr. Welch: I have used sweet corn to give variety to the ration and like it very much; I fed wheat bran with it.

J. M. Stone: How do you care for the sweet corn?

Mr. Welch: I make good sized shocks of the corn bound in bundles, tie tightly around the tops and leave in the field until ready for use. For fodder I prefer sweet corn to field corn.

E. A. Croman: Are beets equal to silage?

Prof. Smith: Beets are good but not equal to silage, pound for pound. I would rather raise succulence in the form of silage than roots.

Mr. Welch: Sugar beets are better than mangels though more difficult to raise.

Song by Mr. Bartlett.

SUGAR BEET RAISING IN MICHIGAN.

DR. R. C. KEDZIE, AGRICULTURAL COLLEGE.

The effort to find some new cash-crop to rival wheat raising in Michigan is not new at the Agricultural College. The production at home of the sugar consumed in our State is a subject lying near the college heart for many years past. Fifteen years ago the college sent out 400 packages of sorghum seed (Amber cane) for trial in various sections of our State. So much interest was excited by the bounty act of 1881 (2 cents a pound), that Daniel Root of Hudson made more than 20,000 pounds of sorghum sugar. It was found that this crop was too subject to frost to be depended on to make the home supply of sugar for Michigan.

SUGAR BEETS.

Six years ago the attention of the public was turned to sugar beets as promising a supply of sugar, and a crop well suited to our climate. Many letters of inquiry were sent to the college on this subject, and it was determined to make an extended inquiry into the fitness of our soil and climate to produce sugar beets of such quantity per acre as would pay the farmer, and of such quality as would pay the manufacturer. Only the best seed was to be used for this purpose. Sugar beets had been frequently analyzed at the college, produced from seed that was labeled "Sugar Beet Seed," but the tubers contained too little sugar to be of any value for sugar-making.

IMPORTED SEED.

The State Board of Agriculture imported from Paris, through J. M. Thorburn of New York, about 1,800 pounds of the best sugar-beet seed,

made up of four kinds: 1. Vilmorins Imperial Improved. 2. Austrian Wohanka. 3. Wanzenleben. 4. White Silesian. More than 1,600 pounds of seed were sent to some 500 farmers for trial, with instructions on mode of sowing, kind of soil, how to cultivate, and how to send specimens of the beets for analysis at the college. All this was without cost to the farmer, except that he was to send the beets free of cost to the college, where they would be analyzed gratis. The instructions were given in Bulletin No. 71, and results in Bulletin No. 82.

RESULTS OF THESE TRIALS.

Results of raising sugar beets in 37 counties.

Counties.	No. of reports.	Tons per acre.	Sugar, per cent.	Purity, per cent.
Allegan	9	13.00	13.18	83.4
Antrim	4	14.00	13.88	86.4
Barry	1	10.00	13.41	78.8
Berrien	5	19.80	15.81	83.4
Branch	10	16.00	13.15	87.1
Cass	1	16.00	12.63	84.0
Charlevoix	4	.....	12.00	83.1
Calhoun	2	14.50	12.76	84.6
Clare	6	.....	15.85	91.9
Clinton	10	15.63	14.34	89.5
Eaton	9	14.50	14.50	84.3
Genesee	1	15.00	16.80	83.1
Gratiot	4	13.60	14 00	89.5
Hillsdale	7	16.83	14.50	89.3
Huron	3	25.00	13.80	93.3
Ingham	26	14.55	14.68	89.0
Ionia	1	.....	17.26	86.3
Jackson	6	13.14	13.14	84.5
Kalkaska	2	11.50	14.17	83.4
Kalamazoo	2	12.50	12.23	79.0
Kent	7	11.00	16.29	85.4
Lapeer	15	14.70	14.09	86.0
Livingston	2	10.00	15.56	91.5
Lenawee	3	12.25	13.13	89.6
Manistee	1	14.00	13.46	84.4
Monroe	2	22.50	13.54	87.5
Montcalm	2	.....	15.53	90.9
Muskegon	8	10.00	14 63	86.2
Oakland	18	10.00	13.33	84.3
Ottawa	1	29.00	16.59	89.3
Sanilac	8	18.00	12.90	85.8
St. Joseph	1	19.80	13.58	92.9
Saginaw	12	22.00	13.38	86.6
Tuscola	3	13.00	14.32	83.0
Van Buren	17	11.00	13.32	80.0
Washtenaw	1	10.50	12.15	87.0
Wexford	1	16.00	13.67	91.3
Reports	215			
Averages	.....	15.08	14.50	86.3

Where the instructions were followed, the right kind of soil used, and disastrous droughts did not prevent the growth of the beets, the results were very satisfactory. The accompanying table gives the results of 215 trials in 37 counties, and the average shows 15 tons per acre of beets, containing 14½ per cent of sugar with a purity above 86 per cent. The

average of sugar beets per acre in Germany is said to be 10 tons, and in France 11 tons. Michigan soil thus outstrips the old world in producing sugar beets, and the quality of the beet stands high. Beets that contain 12 per cent sugar, with purity of 80 per cent, are considered fair quality for making sugar, but Michigan beets are much above that standard.

From this table it is evident that the southern half of the lower peninsula is well adapted to produce sugar beets of good quality and in paying quantity for the farmer. The climate is good for most of the State, but severe droughts are fatal for the beet crop.

The soil best fitted for sugar beets is a sandy loam, or a loamy soil with a permeable subsoil with good drainage. The soil must permit the beet to bury itself in the ground, for all the part of the beet ripening above the top of the ground is worthless for making sugar. A stiff clay, and soil with dense hard pan are not fitted for raising beets, and a mucky soil is the worst of all. Reclaimed muck beds will raise sugar beets of large size, but worthless for sugar-making.

ONE HUNDRED AND FIFTY YEARS OF SUGAR BEETS.

One hundred and fifty years ago this day (March 3) Margraff of Berlin announced the discovery of common sugar in the White Silesian beet—the parent of the whole tribe of sugar beets. Formerly, the world's supply came entirely from sugar cane. The wars following the French revolution turned the attention of chemists to other sources of sugar, and out of the hot-bed of war came the discoveries that filled the world's sugar bowl. The cane is a tropical plant, and the area of lands and climate fitted for its growth is limited, while the sugar beet succeeds best in a temperate climate. Three-fifths of the sugar is now made from beets, and the amount now made in Europe is more than 2,000,000 tons a year. The beet sugar industry is in its infancy in this country, some six or seven factories being in successful operation, while it would take five hundred to supply the sugar consumed in this country, for Americans are the largest consumers of sugar of all the tribes of men.

The subject of beet sugar production is attracting the attention of our people, and a bill is now pending before the legislature offering a bounty for beet sugar made in this State. Shall Michigan enter upon this new industry? Let us consider the subject from all sides, and first look at it from

THE FARMER'S SIDE.

I have received many letters from farmers asking, "Is the sugar beet an exhausting crop? Will its cultivation permanently injure my farm?" If the crop is permanently removed from the farm and the surplus materials aside from sugar are not restored, the crop is an exhaustive one, but if the beet tops and crowns and the pulp left after the sugar is extracted are used for fodder or otherwise restored to the soil, the crop is not exhaustive, but increases the fertility of the farm. The removal of sugar does not remove any fertilizing material, and farming properly carried on with the cultivation of sugar beets when all the residues are

restored to the soil will enrich the soil. The Arondisment of Valenciennes in France lately celebrated the introduction of sugar beets, erecting a triumphal arch on which was inscribed, "*Before* the introduction of the sugar beet industry we raised 695,590 bushels of wheat and fattened 7,000 oxen yearly; *after*, we raised 1,157,750 bushels of wheat and fattened 11,500 oxen." The beet pulp after the sugar is extracted has great value as food for milch cows and for fattening stock.

It is a paying crop. At fifteen tons per acre and $4 per ton, the acreage crop is worth $60.

It is a cash crop, and finds its market at home.

Three strong points in favor of sugar beets are: 1. Enriching crop. 2. Paying crop. 3. A home market.

The farmer's side is bright!

THE MANUFACTURER'S SIDE.

1. He must be assured of a reliable crop of good beets, year after year, for a long period before he can safely invest $400,000 to $750,000 for a beet-sugar factory. To supply the beets, 3,000 to 3,500 acres of beets must be raised each year, and as the beets should not be raised in consecutive years on the same ground, this will require 6,000 to 7,000 acres of land to stock a factory, or the arable land of an average township.

2. Plenty of limestone, coal, etc., and good railroad facilities.

3. Plenty of good water, free from salt, which prevents crystallization of sugar. When you consider that a beet-sugar plant requires 2,000,000 gallons of water a day, you see the importance of a good supply of good water.

4. He must have the best science and skill to manage the factory, for he is in competition with the accumulated science and skill of fifty years' experience in Europe.

5. He must have the best and most labor-saving machinery of the world, for he is pitted against one of the great industries of the world, and no make-shift apparatus can stand the competition. Germany pays an export bounty of a cent to a cent and a half for every pound of sugar exported, and France is preparing to offer a similar bounty. The manufacturer must fight on the economical battlefield these powerful nations, who are determined to hold the foreign markets. Germany pays this heavy bounty by taxing the sugar used at home, and sugar retailed at seven to seven and one-half cents a pound in Frankfort while the same sugar was selling for four cents in the United States.

HOW TO COMPETE WITH THE WORLD.

Have the best of everything for this work: the best beets, best site, best water, best science and skill, best apparatus the world can offer, requiring the least labor and turning out the largest amount of "sugar of consumption," fit for the table, and not "sugar for refining," thus placing ourselves at the mercy of the sugar trust. No half way work or cheap apparatus will serve in this industrial warfare. Nor cider or sorghum mill and evaporating pan, which will only burn your fingers and bankrupt your pocket! The best means of every kind will give best results.

Can this be done? Yes. But it is no light task and should be undertaken only after counting the cost. Michigan can come to the front in this industry, but she must pay the world's price for the position.

DISCUSSION.

LED BY PROF. C. D. SMITH, AGRICULTURAL COLLEGE.

It has been pretty clearly demonstrated that sugar beets can be grown over the larger part of the southern peninsula. I want to call your attention briefly to some of the points in caring for the crop.

A good, deep naturally fertile sandy loam is the best soil. Don't try a stiff clay or an old swamp. Plow deep and thoroughly make the tilth as fine as a garden. Sow the seed early in May, as soon as the ground is fairly warm, in rows eighteen inches apart using fifteen pounds of seed per acre. Do not let a crust form on the surface. Prevent by the use of a light harrow. Cultivate as soon as the rows are visible with hand and horse hoe. Thin to one beet every eight inches when they are three to five inches high and show four leaves. While the hoe may be used to cut out the spaces the actual thinning must be done by hand and involves a large amount of disagreeable labor. Anyone who has visited Europe in May has been saddened by the sight of the German women and children on their knees in the hot sunshine thinning beets. We do not want to see the wives and sisters of American citizens in that kind of occupation.

After the beets are thinned the cultivation should be kept up as often as needed till the leaves cover the ground. Harvest when the outer leaves begin to turn yellow. Expect from ten to fifteen tons per acre of beets, or one ton to three thousand pounds of sugar per acre. The profit depends on having the beets of small size and fully matured.

Dr. Kedzie: It is important to remember that not only must the juice of the beet be rich in sugar but it must also be comparatively free from other salts. The presence of a very small amount of certain salts renders a per cent of the sugar non-crystallizable or in other words molasses. Some of this molasses can be utilized for sale, but in Germany it has to be fed to the stock or is thrown on the fields.

R. Morrill: Do not railroads carry beets to the factories in Nebraska?

Dr. Kedzie: Yes. The limit of car transportation is about fifty miles. Originally the farmers received about three dollars per ton for their beets containing twelve per cent sugar; gradually the price has raised to four or five dollars a ton. At the start the contract signed by the beet raisers did not provide for the delivery of pulp to the farmers because the latter did not want it. So the manufacturers took it and began to feed cattle, erecting large sheds for the purpose. This made the farmers envious and a quarrel ensued. The farmers near the factory struck; then a year of drouth brought disaster to the beet crops; to supply the demand beets were brought in by cars. Since then the matter has been adjusted and they are now producing beets for the factory. The bounty at one cent a pound amounted to $140,000 dollars a year.

R. Morrill: The thinning of the beets need not be such a bugbear. Our men in the fruit regious get so expert with a hoe that they could do

most of the thinning with that implement, bending their backs occasionally to thin where the beets are too close together to permit the use of the hoe.

Q. What does beet seed cost per pound?

Dr. Kedzie: For growing beets for a factory none but pedigreed seeds selected for generations back should be used. Such seed would cost eighteen to twenty cents a pound.

Thos. Gunson: Growing sugar beets must be considered in its economic relation, and it seems to me that if Germany is so determined to produce the sugar that she will tax her own inhabitants to furnish it to us cheaply, we ought to let her do it while we devote ourselves to other crops.

Q. Would the pine sands be suitable for beets?

Dr. Kedzie: The texture is all right and the sands will do if rich enough. They would have to be fertilized for several years in advance.

Q. What is the character of the soil at Grand Island, Neb.?

Dr. Kedzie: It is prairie soil somewhat sandy and exceedingly permeable, so permeable in fact that the Platte River flows through the ground some three or four feet below the surface, it is therefore in every respect ideal for sugar beets.

Q. Will sugar beets grow on land that will grow mangel wurzels?

Dr. Kenzie: Mangels will grow on mucky soil and so will sugar beets, but the latter will be good for stock feeding only. They will be worthless for sugar.

Q. How many pounds of sugar beet seed per acre must be sown?

Dr. Kedzie: Fifteen to twenty.

Q. How many tons per acre should beets produce?

Dr. Kedzie: Fifteen tons.

Q. What is the relative amount of work between beets and beans?

R. Morrill: Sixteen to one!

Prof. Smith: Vastly more work with beets than with beans.

Q. What would you do with the products if you raised sugar beets experimentally with no factory in the vicinity?

Prof. Smith: Feed the beets to the stock, they are worth all they cost for that purpose.

Q. How are we to know when we get thoroughbred beet seed?

Dr. Kedzie: We will have to depend on the honor of the dealer, the importer of beet seeds will sell them true to name.

C. W. Garfield: I have seen the women in France and Germany at work thinning the beets by hand under the blazing sun and in the hot and dusty fields. If it is to be understood that we are to compete with Germany in this respect I do not want to see the industry flourish. If the success in growing sugar beets means that the wives and sisters of the American citizens are to be degraded to this level I do not want to see the experiment tried.

Q. Should the geological survey of the State be abandoned?

Prof. C. A. Davis, of Alma College: There is a bill introduced into the legislature to abolish the geological survey. To this bill the farmers should object. The survey is useful in many ways to farmers. In the first place it is contemplated to go over each county carefully to study such geological features as are of value. For instance the water supply is carefully looked after; the surveyor calls at every house and examines the

well. Dug wells are found to be almost universally bad. They are constantly foul and oftentimes sources of disease, especially typhoid fever. Such wells should be abandoned. The survey also tests the water for mineral matter in driven wells, some such wells are salt but upon being driven deeper are free from saltiness. Again, flowing wells are investigated and the relation between the flowing well and its supply studied. It was noticed at Alma for instance that when larger wells were sunk lower down the older wells stopped flowing. In drilling wells it is necessary to have the casing tight even through the rock to keep out the contaminating water.

It has been demonstrated that boring for oil in this State has been useless. The survey is doing practical work and its results are accessible to every one. Its office is at Houghton in the upper peninsula.

WEDNESDAY EVENING.

A. E. Palmer, of Kalkaska, in the chair.

FLOWERS, THEIR INFLUENCE ON RURAL LIFE.

THOMAS GUNSON, AGRICULTURAL COLLEGE.

It was a very happy thought that occurred to the author of the Round-up program to set aside an evening's session to a consideration of things that help to make rural life attractive. My only regret is that one more able than I am has not been found to introduce the evening's thought, fitting the ability, dignity and ripe experience of those that are to follow.

Who can measure the power of influence? Who can fix the secret, subtle and mysterious agency that has time and again moulded characters and shaped destinies? The closer men and nations come to each other, the more distinctly it is felt. Its power is ever before us in some form or another, and unfortunately its power for evil is perhaps stronger than its power for good. No mind, however trained and unbiased, but has at some time or other fallen a victim to its power; and no nature, however low and degraded, but it has been able to move for better or for worse. Its power does not always consist, however, in things felt; it is equally as powerful in things seen. Impressions made on the mind by seeing or hearing constitute a large part of the raw material upon which character is built. How essential it is then that these impressions be of an elevating and refining nature. This is what civilization means, and it is for this purpose that churches, schools and colleges exist among men. I don't believe that we, as institute workers, are doing our whole duty if we fail to inspire others by precept and example to higher and better work. It may be that through some word spoken, some natural law clearly and forcibly explained, some plain truths illustrated, some man may have been stimulated into brighter hopes and higher ambitions.

There is no influence so powerful, so permanent, or so real, as that of environment; and there is nothing else outside of family, friends and books, that will take the place of trees, plants and flowers. No man can be either lonely or illiterate that can take a lesson every day fresh from the book of nature. No soul can be very dark whose being brightens up at the sight of a simple flower.

TREE AND FLOWER INFUENCE.

The power and influence of trees and flowers over mankind in general is every day becoming more manifest. There is scarcely a city of any importance in this or any other country but what recognizes their power as a moral and educating factor. Despite the hard times lavish—in many cases injudicious—expenditure of the public money is being made every year for this purpose, with scarcely a voice lifted against it. New York city has determined to throw off her infantile misnomer and demonstrate to the world her superior wisdom by maintaining a botanic garden at the public expense.

It was my privilege two years ago to go up the beautiful Detroit river in a boat in company with a gentleman who had interested himself in the purchase by the city of the most unique " city's breathing place " there is on this continent, and this gentleman assured me that outside of its being more than an ordinary successful business venture, it had been worth to the city, as a moral and refining agency, many times its original cost.

ANOTHER STRIKING ILLUSTRATION

of the power and influence of plants and flowers over human nature came under my notice a short time ago. The legislature of 1894-95 appropriated $1,000 to build a small greenhouse at the Industrial School in Lansing to grow vegetables and vegetable plants necessary to plant the large area it takes to supply the increasing demands of the institution, and at the same time to furnish some labor for the far too many hands needing something to do there. Squads of these little wayward fellows are detailed to work there and on the lawns. So interested have some of them become in the work that every available space under the benches is divided into all sorts of shapes and used as a miniature farm or garden as their tastes may incline. Some were germinating seeds in sand and in soil, with and without manure. Some were propagating and growing plants fairly well under conditions that seemed well nigh impossible for them to live at all.

It was interesting to notice the straightness of the rows, the diversity of the crops, the general neatness and tidiness that would have done credit to older heads in larger spheres. Here the complicated science of agriculture and horticulture was furnishing amusement for these little street-corner Arabs. The attendant informed me that it was no unusual thing to see long rows of these boys lying on their sides in the narrow mud alleys during the hours given them for play, preferring to watch their crops to any other amusement. It is needless to say that in matters of policy regarding their state or territorial rights they are all strict

constructionalists, and believe in an aggressive interpretation of the Monroe doctrine.

Their power of remembering plant names and the evident pleasure they show at seeing some tree or flowering plant with whose names they have become familiar in some way, but have not seen before, is one of the most interesting things I know of. Coming so closely into contact with plants and flowers in this way, it has developed in them to a marvellous degree the power of observation, and I can assure you the number and quality of the questions these young lawbreakers can ask would be of interest at any Farmers' Institute.

I don't want to make out that it is necessary to first make a criminal of a boy before we can by State aid make a farmer of him. That these somewhat depraved boys show a natural affinity and interest in the work of growing plants that is seldom seen in boys brought up on the farm, few will deny. It may be that the work is new to them, and, perhaps, the best thing they can do to pass away the time, whereas with the country boy such work has lost its novelty and interest.

Whether any one of these fellows will ever add one cent of value to an acre of land by seeking labor as farm hands and eventually owning farms themselves, time alone will determine.

The naturally vicious and wicked, like the poor, will always be with us, and if these young minds can be interested and influenced with natural things, the impressions are usually lasting. The opportunities afforded these boys—meagre as they are—far exceed those of the average farmer's boy if we may judge from the barrenness and the nakedness, the distressing shiftlessness and thriftlessness, or perhaps hopelessness, that surround so many farm homes. Studying and observing growing plants as illustrated—crudely perhaps—by these boys, is just what is being done on a larger scale all over the country by means of experiment stations, farmers' clubs and institutes.

THE POWER OF OBSERVATION.

It is admitted that there is no agricultural disease, and that the difference between success and failure in rural pursuits is just in proportion to the power of observing and adjusting ourselves to the ever-changing social and economic conditions. There is no faculty that we possess capable of so great cultivation as the power of observation. This power of observation is the power of intensifying thought upon objects seen so as to produce lasting impressions. To be able to see things and make an intelligent note of them is a power we all possess only in proportion to the cultivation we have given it. The powers of observation are quickened and aroused to the beauties of nature by trees and flowers, in a way that nothing else can, and the farmer, above all others, can study simple nature to the best advantage. He can make for himself every tree and every vine a teacher; every flower a book of art; every fruit food for scientific thought.

Careful observation reveals to us the strong humanizing influences exerted by the cultivation of fruit and flowers; there is a refining influence that comes from their daily care and culture that forms an important factor in the civilization of today. They not only conduce to a refined taste, that they appeal to the sympathies and arouse the nobler

instincts. It may be argued that the farmer can ill afford to spend time and money in making smooth lawns, fine walks, flower beds and borders filled with expensive plants, for appearance sake, or simply to gratify aesthetic tastes. It is not necessary that he should do either to any great extent, but that he should do a little of both few will deny. There is no better way for him to improve the value of his home, socially, morally, and financially, than by a little care and attention in this.

Many of our best farmers have long since realized the necessity of it, and while their investment in this direction may not have been on what is known as a strictly paying basis, it is impossible to fix it at its real value. It may be correct to measure all earthly possessions in dollars and cents, but there is a great mass of material necessary to a civilized existence that cannot be measured in the currency of the country. Friends, books, pictures, music, are an absolute necessity, and people living in cities can enjoy them more or less at trifling cost, but they are only within the reach of country people to a limited extent. They in consequence must rely on something else to make up the deficiency. Nothing will supply so large amount of this as trees and flowering plants. It is not necessary to keep up a gay calico-like arrangement simply to make people think that you live in some earthly paradise. In some of our large cities the exact opposite is too often the case. Have a few simple everyday plants—plants that you know something about, and if you don't know try and find out. Learn the history of your plants, their characteristics, their marvellous adaptation to conditions, their persistency and purpose. I often think

HOW INTENSELY PRACTICAL PLANTS ARE.

There is not a part of their whole organism but what has a fixed and definite function to perform. No superfluities with them; no doing things for the mere sake of doing. Every organ contributes its portion to complete the cycle of a well rounded existence.

It may be that farmers have no disposition to bother themselves with such apparent trifles, and that it is more to their interest to study the ways and means by which they can stay the hand of every other man that they fancy is raised against them; or they may think that their work and condition, however important, is of no interest to the world in general. The nations of the earth were never more interested in rural life and work than at this time. The sensual and silly goddess of Du Maurier has readily given way before the simple country characters of the Liverpool preacher.

With systematized methods and improved machinery; with bright prospects of a free everyday mail delivery; with distances made less by telephones, and highways permanently improved, either by legislative enactment or by some method suited to the farmer yet in embryo, people living in sparsely settled districts will be brought closer together, the farmers will necessarily have more time to themselves, they will be brought more into touch with the world's sympathies and civilization, and rural life will demand its desired and deserving recognition, in the front rank amongst the occupations of men.

HOME LIFE ON THE FARM.

MRS. MARY A. MAYO, BATTLE CREEK.

What constitutes a home? To the wandering red man of the west home is wherever he rolls himself in his blanket and lies down to sleep. To the nomadic wanderer home is where he nightly pitches his tent. But to civilized man home stands as an abiding place. It is his fortress where he can gather his loved ones about him, and say to all that is impure and unholy: Stay out! Here I will rear my children, maintain my family. Here I will live and die.

If the time has come in the history of American farming (and I believe it has), when intensive cultivation of the soil is a necessity, it is equally true that there must be intensive cultivation in the home. Brawn alone, as marking the successful farmer, must be set against cultivated brain power. If it must be more to the acre in crops, it must be more to the man in the scale of manhood. And where shall we begin? In our homes, your home and mine.

IT IS AN ABSOLUTE NECESSITY

that we should teach our children self control. Our penitentiaries and homes for reformation are filled today by persons who know no control save the strong arm of the law, and it is a fact that the children of today who know no control or restraint in the home will be the men and women who will fill our prisons and reformatories in the future. In all kindness toward the child, and in the love that the parent bears toward it, let it be taught to obey those in authority.

One of the greatest needs of our country today is honest men—where shall we find them? We must rear them in our homes. It is not infrequent that we find parents, who in a business relation pride themselves as to their honor and integrity, and yet they will deceive their own children and think nothing of it. Parents are unconsciously moulding and shaping the destinies of their children by the little silent influences of their everyday life. Children, of all others, know whether their parents are honest or not. Your influence as parents is not confined to the children in your own home, but every boy and girl in the community bears to a greater or less degree the impress of your character. Let that character be clean, pure and strong. If there is to be intensive cultivation in the home, there must be better tools and methods for this cultivation. And these must be met by more and better reading matter; with time for study and thought. This is imperative. We must know how to become not only better farmers, but that which is of much more importance—better parents and citizens. It is home rule that must be the salvation of the American people. To this end let there be an abundant supply of

GOOD WHOLESOME LITERATURE

for each member of the family. A growing boy or girl cannot assimilate and thoroughly digest the mental food suited to an adult. The

child's mind must be fed—it will be fed with some kind of food, and if good, nourishing mental food is not supplied by the parent the child will find something for himself, and the chances are it will not be of the best quality. Your child might better starve mentally than to feed its mind with any of the vicious trash with which this country is flooded. Let each child have its own individual reading matter. This will in a measure solve the question of how to keep the children home nights. A love for good reading is almost proof against vice. Some complain that they cannot afford to have good magazines, books and papers. *You cannot afford to be without them.*

If the money paid out for candy, peanuts, ice cream, and soda, with the tobacco money, was saved, there would be sufficient to purchase good literature for many of the families of our land. The money that is spent in the United States for that which profiteth not would buy all the reading matter necessary for any family. Too much attention cannot be given to the kind of reading placed before the young people. The books they read are their companions and are moulding and shaping their lives not only for time but for eternity. Show me the books that a young person likes to read when they are alone and I will tell you the kind of a man or woman they will make.

THE FARM HOME TABLE

exerts a wonderful influence over the inmates of that home. Next to the family altar it is the sweetest gathering place. Frequently it is the only time in the day when the family are all together. Let it be more than a feeding time. It should be a time for the exchange of thought, stories, good cheer—anything that will serve to make the family happy.

The best dishes are none too good for the family. Some one says—my best dishes are for company. Whom do you call better company than husband and children? Put away those old, white, chipped, marred dishes that you have used so long and take down the pretty dainty ones that are put on the top shelf in the pantry and only used when company comes, and use them every day. You can never measure their influence upon yourself and your children. And besides, if you do not use them, some one else will when you are dead and gone. Have the first use of that which you have earned.

Good manners should be taught and cultivated in the home. We have no business to bring up our children with uncouth, unmannerly ways and habits. They will sooner or later go out into the world, meeting and mingling with the people of the world, and a pleasing address, ease of manner, coupled with true politeness, is a good stock in trade to any young person. Good manners are but kindly thoughts kindly expressed. And humanity is hungry for just this. The farmer should be characterized as the true gentleman, and his family should be trained along this line. Too many best rooms in farm homes are set apart for the use of the occasional guest. Use your *best rooms* for the family. Light up nights. With kerosene so cheap, and with fuel for the cutting, there is no reason for the family sitting around the kitchen stove evenings by the light of a small kitchen lamp. Plan for "good times" in the home. The active, growing child or young person demands a good time, and he is

going to have it somewhere. If he cannot have it at home, he will go to the neighbors, or to some barn, to the corner grocery, or to some well warmed, well lighted, death dealing saloon.

A THANKSGIVING PROCLAMATION.

The farmers are complaining (and for cause) of the hard times. Yes, the times are hard. Crops have been short, and prices shorter. Taxes have been constantly increasing and the ability to pay decreasing. And yet with all this the farmer has much to be thankful for. The farmer is not the only one who feels the stringency of the times. We complain because we have to work, but work is one of the greatest boons God ever gave to humanity. "In the sweat of thy face shalt thou eat thy bread" was not a curse, but a blessing. There are thousands and thousands of persons, just as good as any of us farmer folk, who are today begging for work, and there is no work for them. Of the thousands of families helped by the superintendents of the poor, but a fraction ever goes to the farmer's family. He has plenty to live on; not only the necessities of life, but many of its luxuries. His family will not suffer from cold unless he is too shiftless to cut the wood. His children do not go barefooted nor with insufficient clothing. He has still enough and to spare. If our present financial depression can be helped, let it be helped. If it cannot be helped it is no use to grumble about it.

Be loyal to your farms, and "go forward." The command given to God's chosen people ages ago remains today, and it is for us. "Speak unto the people and tell them to 'go forward.'" Stand by the farm home. Farm your farms well, but farm your lives and your homes better. And the light of your resurrection morn will be radiant in the fulfillment of the promise, "Unto each according as thy work has been."

THE SURROUNDINGS OF THE FARM HOME.

HON. C. W. GARFIELD, GRAND RAPIDS.

The first important consideration in connection with the development of rural home surroundings, to make them effective in the molding of character, is to have an attractive "in-look." The rural home should have an atmosphere of benevolence; the passer-by should be induced to check his pace, or slow up his horse to enjoy more fully the pleasing effects produced by tasteful arrangements of the attributes of the outer home; and if, perchance, the charm was such as to induce him to turn for one last, lingering glance after having left the premises, one object in their embellishment would be satisfactorily accomplished.

BUT A FAR MORE IMPORTANT CONSIDERATION

is the "out-look" from the house. The trees, shrubs, vines and grass should be so artistically arranged as to produce pictures more entranc-

ing to the eye than those which may be hung on the interior walls. The opportunity for this artistic work is far greater in connection with the farm home than within the limited premises of a village or city lot; and while, to secure the most satisfactory triumphs of landscape art, the services of a professional are required, still very beautiful pictures can be made by any lover of nature who is willing to use his eyes when he has opportunity to observe nature unspoiled by man's devices. There is nothing that can add greater zest or keener satisfaction to life on the farm than the seductive occupation of weaving into the immediate embellishments of the home the ideas found in nature's entrancing pictures in woodland, stream and meadow.

All these attributes speak eloquently of the rest, peace, beauty, comfort, inspiration and religion of the home. We are apt to undervalue the things which are not important as connected with the getting of a living. We are forgetful of the fact that the most important things in the world cannot be measured by any unit of money. We rank home influence and character development under a beautiful environment, along with sympathy, kindness, counsel, and love; and pronounce this attainment the highest consideration in connection with the ornamentation of a home. I still maintain that material, financial considerations should induce farmers to build in good taste, to plant trees in abundance, to maintain a lawn, to utilize flowers and shrubs, and especially to have everything conveniently arranged with reference to the accomplishing of the regular routine of daily duties.

THE GRATIFICATION OF ALL THE SENSES

in connection with the embellishment of the home must be emphasized. The trees planted for the purpose of tempering the cold winter winds could be so selected as to give a musical effect to the moving air in summer, producing a harmony attractive to the ear, while affording delicious shade and pretty pictures for the enchantment of the eye. The eglantine and sweet-scented shrub, exhaling delicate odors that appeal so pleasantly to the sense of smell, fill a place as important in every way as fruits that satisfy the palate. The wisest and most tactful combination that can be made with slight expense will add to the material resources. The cost of this greatly added value which people of means appreciate is inconsiderable; the returns from it are large. I can adduce

NUMEROUS ILLUSTRATIONS

in confirmation of the statement that valuable returns will certainly accrue from the sale of tastefully embellished premises. A single elm tree has been known to add a thousand dollars to the value of a piece of land; a line of trees well selected and carefully planted has been known to add hundreds of times their cost to the value of the farm.

I will close by enunciating a tribute of respect to those who are willing in the formation of a country home to make its atmosphere the leading object in its development. The formation of character as a result of its esthetical quality, its hospitality, its public spirit, its intellectual

life, and its religious inspiration is the greatest thing connected with home building. All of these most delightful attributes are awakened and conserved by the interest that is evolved and maintained in the evolution of a delightfully embellished home, such as can be developed in the country more perfectly than anywhere else in the world.

THURSDAY FORENOON.

J. N. Stearns, of Kalamazoo, in the chair.

QUESTION BOX.

Q. Will Mr. Palmer tell about fattening hogs on silage?

A. E. Palmer: I suppose the question refers to corn silage, although silage may be made of various materials. I have found that I can round up and finish off the pigs for the last six weeks with as much profit using silage as whole corn. This is due largely to the fact that the kernels of corn are softened in the silo. I have no peculiar way of doing it except that I substitute silage for corn and that the previous feeding of the pigs has been skim milk and clover pasture. I have no doubt that soaked or ground corn would be equal to silage but I am prepared to say that the latter feed is a good one for hogs.

Q. Which is better for feeding stock, old or new process oil meal?

Prof. Smith: Both are good; equally good for most purposes. We find, however, that the stock seems to like better the old process meal when the cake is broken up to about pea size.

Q. What tool is best to put a corn stubble into wheat without a plow on muck land? How would the Acme harrow do, or a Cutaway?

C. B. Charles: I have used both the Acme and the pulverizer; one after the other. I like the spring tooth better than either in most cases. A spike tooth harrow is also good for this purpose.

Q. Can alfalfa be grown successfully in this State?

Prof. Smith: Yes and no. No farmer should try it on a large acreage at present. This plant demands a deep, well drained soil and a reasonably dry season. Plow deep, subsoil if necessary, prepare the ground carefully in the spring, sow about the same amount of seed as red clover, mow the weeds, and trust the rest to nature. When the crop does well it usually produces two mowings or three in a season.

Q. Is alsike clover of much value?

A. (Several farmers.) Equal if not superior to ordinary red clover. Sown with timothy it heads with it and makes a good filler, covering the ground.

Q. What is the best way to carry slop from the house, leaving out of consideration the barrel and truck?

J. H. Brown: I have tried the drain, using large sized tile and conveying it to a considerable distance, but I prefer the truck.

Prof. L. R. Taft: To properly construct a drain from the house I would use sewer pipe for some considerable distance, carefully cementing the joints and using a trap to prevent the return of gas. This sewer pipe should end in a settling basin, easily constructed, which would prevent the farther passage of the fatty matter. This settling basin empties through a tile drain one foot below the surface into the kitchen garden, which it both irrigates and fertilizes. I would use a four inch tile for this purpose. In a dry season the benefits are very conspicuous. By all means see that the tile is of good size so that if it settles a little out of place it will still allow the water to flow through it.

R. Morrill: The cess pool is a breeder of trouble. I have the outlet fully thirty rods from the house, with a trap near the inlet. I bury the drain deep enough to prevent freezing and put in a vent-pipe to allow escape of gas, extending the pipe above the roof. I connect the eavestrough to the sewer system so as to flush it by every heavy rain. The water can be turned either into the cistern or into the sewer.

R. L. Taylor: I use four-inch concrete tile which fit closely together and allow no exit of the sewer gas. I have a connection made with the cistern so that I can flush it when I choose. This system has run twenty years and has given us no trouble.

Mr. Green: We flush our sewers occasionally with a barrel of hot water to carry out the grease; we use also vitrified tile and hydraulic cement.

Q. Does it pay to cook feed for hogs?

R. Morrill: Yes, in my opinion it does in cold weather. In Butler county, Ohio, they have found that soaked corn is more thoroughly masticated and better digested than dry; it produces therefore greater gains.

Otto Mey: I do not agree with Mr. Morrill. The results of all the experiments which I have been able to consult, and I have watched the records of experiments in Canada, Michigan, Wisconsin, and elsewhere, go to show that there is a loss by cooking, varying from a small per cent to as high as twenty-five per cent. It seems to have been almost conclusively demonstrated that it doesn't pay to cook anything for pigs other than potatoes and possibly beans.

R. Morrill: Under the peculiar conditions existing at the station it evidently did not pay to cook the food, but where longer tests are made and the hogs are accustomed to the cooked food gradually and for long periods, it is the experience of hog raisers that cooking and soaking food does pay. I used to keep a good many hogs, before I went into better business.

Jotham Allen: What business does Mr. Morrill find that beats hog feeding?

R. Morrill: I have gone into the fruit business and find that it has paid me better than hogs, because I am so situated in relation to the market and under favorable climatic conditions that I can make it pay.

Q. Will Mr. Brown give the breed which he so much advised, but unceremoniously passed?

J. H. Brown: The form and test of the cow is more important than her breed as far as returns in butter and milk are concerned. I advise the farmer who is going into the making of butter to look among Jerseys or Guernseys for the style of cow that will best suit his purpose. The Short-

horn may be recommended for the farmers who are going to raise beef as well as butter.

Q. Will it pay to build a silo to keep six cows?

A. E. Palmer: I hardly think it practical for that small number.

Q. What breed is best adapted to make a bacon hog of 175 pounds?

Prof. Smith: The Duroc-Jersey, or the small Yorkshire, as they have been formerly bred, will serve the purpose. Both breeds are now being selected toward the fat, chunky type.

Q. At what stage would it pay to turn rye under for green manuring?

R. Morrill: Just before it heads out.

J. N. Stearns: Be careful not to allow it to stand too long. Plow it under when it is entirely soft and before the grains begin to harden.

Q. What is the value of beans as compared with hay at $7.00 a ton?

A. Beans are very valuable as an addition to corn for store ewes or fattening lambs.

C. S. Bartlett: Bean straw is an excellent fodder for sheep. Henry Ward of Pontiac, who is feeding 25,000 sheep, pays $4.00 a ton for cull beans.

Mr. Brundage: I like bean straw for sheep or cow feed better than timothy hay, but it should not be fed alone. I use it as an extra ration.

Q. Why is mammoth clover better than June clover as a fertilizer?

R. Morrill: I know the fact that it is better but I cannot give the reason. I suppose it is largely because it grows larger. Mammoth clover gives us a better stand, though the medium clover may give proportionately more roots. Where the whole crop is plowed under I prefer the mammoth.

By unanimous vote of the audience Mr. R. M. Kellogg of Three Rivers, was requested to speak on "Soil Tillage" rather than "Pruning, its Objects and Limitations," as laid down in the program. He complied with the request.

SOIL TILLAGE.

R. M. KELLOGG, THREE RIVERS.

The low prices and lack of market are not the most serious things that confront the farmer today. His farm is being rapidly depleted of its fertility and ability to give a reasonable return for the labor expended.

Clover has been the "sheet anchor" of American agriculture. So long as the farmer could put his land through a four years' rotation with the clover as one of the crops, the ground was stored with nitrogen and a vegetable mould or humus which made the soil soft and mellow, so that the gases were held for the plant and large amounts of water were stored up for use of the plants during the dry season. But the insects attacked the clover and, aided by the past six excessively dry seasons, the humus has been burned out by the continuous cropping, until the soil particles have been brought close together and the ground now parts with its moisture with the greatest celerity and is easily baked and rendered so hard that the roots cannot penetrate it. The clover seed being necessar-

ily sown on the surface a spring drouth of even a week under the influence of a drying wind destroys the young plant.

THE FUTURE OF CLOVER.

Unless we have early and frequent showers during April and May I predict more failures in seeding for the coming spring than ever before known; all because of the lack of humus to hold moisture. It was not until 1888 that the discovery was made that clover roots were infested with bacteria which had the power to gather nitrogen from the air and store it in the soil. Further investigation revealed the fact that these same bacteria lived in other plants which are now known as leguminous.

In the southern states they have a pea called the cow pea. It is now known that these bacteria work on the roots of these peas even more than on those of clover. Wishing to prepare thirty-five acres of worn out land for strawberries and put it in the best possible condition, I sowed it to these peas and plowed them under in the fall and am greatly pleased with the result. The soil was a sand loam destitute of humus and even a light rain caused it to bake very hard and dry out very quickly.

The peas made an immense growth, many exceeding six feet in height, shading the ground so as to smother out all weeds, and the ground was literally filled with nodules or nitrogen traps, and is now soft and mellow.

During a recent trip among the institutes of Indiana, I found several persons who had used the pea. On one piece set to strawberries, which had had no other fertilizer than crop of these peas plowed under, the plants had made a growth surpassing anything I had yet seen. Now if you can sow these peas in the spring and turn them under in time to sow wheat, and the following spring apply the clover seed, we shall find a mechanical condition of the soil which will hold the moisture and the nitrogen in the soil and will stimulate the growth so that if ordinary climatic conditions prevail, we shall, with proper rotation, bring our soil back to its old time productiveness.

BUT WHY DO WE PLOW AND CULTIVATE?

In most soils there is an abundance of plant food but it is not available; plants can't use it. They take their food as water charged with a little mineral substance which is passed up through the center of the plants to the leaves, where it is digested and combined with carbon and other gases taken from the air and passed along down under the bark where the wood cells are built up. Fully ninety-five per cent by weight of all vegetables come from the atmosphere. Now, if all this plant food in the soil was soluble so as to be appropriated by plants, it would all be washed out and soon the soil would be destitute. Nature has provided for its preservation by making a chemical change, rendering it insoluble in water; at the same time providing a resolvent which renders it available, and this resolvent is the oxygen of the atmosphere.

While oxygen is the great destroyer of nearly all substances, yet nothing could live without it. Now when we plow and pulverize, we let

this air into all parts of the soil and this food is prepared for the plants so they can assimmilate it, hence the necessity of crushing every lump and working the ground so that all parts shall be brought liberally in contact with the oxygen of the air.

Many people think the sole object in cultivating is to kill weeds, but we should not get a vigorous growth if there were no weeds, for if the ground is not stirred the chemical change again takes place and the available food becomes insoluble and plants cannot appropriate it, hence we must cultivate, weeds or no weeds.

Then again we cultivate to conserve moisture. Many people labor under the impression that stirring the ground makes it gather moisture from the air and the more you stir the wetter it becomes. This is a mistake. The more you stir the ground the drier it becomes.

THE ACTION OF THE WATER

is governed by two forces; gravitation pulls it down into the ground, and capillary attraction returns it to the surface again. "Capillary" means a hair-like tube or passage. The soil particles are uneven and irregular in shape but they adjust themselves together very closely and yet all among them are minute passages through which water will draw. The wick of a lamp will illustrate this; the oil passes up through the wick until it reaches the flame where it passes off, but when we extinguish the light the oil draws up until there is a balance between gravitation and capillary attraction and no more oil will arise. It is the same with blotting paper. If we drop grains of sand on a wet cloth we shall see that each particle surrounds itself with a thin film of water. To secure this upward movement of the water we must have the soil particles very close together. If we separate them, disarranging their position so as to make the little cavities larger, as we do in cultivating, the water cannot pass from one soil particle to the other. It will draw up through the lower part but when it reaches the loosened or cultivated part it can come no higher but must remain there for the use of the plants. So that having plowed deeply in the spring to render plant food available, we can keep it so by merely breaking up the top crust so the air can enter these minute passages and at the same time prevent the escape of moisture. All this is accomplished best by allowing the cultivator to go no deeper than necessary to protect the firm earth from the sun and free air.

From one to two inches deep will, as a rule, secure desired results and give a root pasturage near the surface so the effects of the sun's rays will stimulate a much more vigorous growth.

TO SUM UP THESE PROPOSITIONS

then, we must, by applying humus as barnyard manure, or plowing under some green crops, secure a vegetable mold or humus and a satisfactory mechanical condition of the soil, and preserve this by frequent change in crops. Plow deeply and thoroughly; expose every particle of the soil to the oxygen of the air; and then cultivate frequently that the particles of earth shall not re-adjust themselves so as to make perfect capillary

action, carrying the water to the surface to be carried off by the sun and wind. Thus, with liberal replenishment of needed potash, phosphoric acid, and nitrogen, we shall be able to multiply the annual yields and liberally reward the tiller for his labor.

DISCUSSION.

In the discussion which followed Prof. L. R. Taft took up the subject of pruning.

More knowledge is required to prune properly than to till properly. In pruning we need to know the habit of growth of each variety of plants as well as the special environment of each individual plant. In pruning young trees we strive to develop the best frame work to support the leaves and the fruit, and our pruning is directed to securing the proper distribution of leaves and fruit. We strengthen the stem by cutting back, bringing the head of the tree nearer the ground, giving the sap a less distance to travel, thus forming a thick and succulent trunk.

THE TREES SHOULD HAVE LOW HEADS.

First, because the trunks are thereby shaded; second, the later pruning is done more evenly; third, the thinning of the fruit is done more easily; fourth, the very act of cutting back helps the thinning of the fruit; fifth, the spraying can be much more easily and effectively done and, as the spray must be delivered in the form of a fine mist, the nearer we can get the nozzle to the branches the greater the economy of the fluid and the efficiency of the application. Finally the fruit can be much more easily gathered from a low tree than a high one.

For young trees of most kinds of fruit it is wise to head back fully one-half or even two-thirds. Select three to five shoots and cut back to five or six strong buds. Leave the center shoot and allow branches to come out not from one point but at intervals along the upright stem. In that way there is less danger of crotches.

When planting peach trees cut back to one or two buds each on four shoots, cutting out the middle shoot to make an open head and leaving the side branches. So much for the first starting. As the season advances remove the surplus branches but not the leaves, as it weakens the growth. Rub off the surplus shoots at any time during the season.

Adjust the pruning to the habit of growth of the given variety. In spreading varieties have the shoots grow upright; in varieties already too upright leave the buds so as to throw the shoots to the side. While it is wise in the second spring to head back the shoot, do not carry this practice to excess in the peach tree for fear of forming too thick a head. Seek rather to widen the tree, by leaving the side branches fifteen to eighteen inches long. After this, as with other kinds of fruit, head back one-half for four or five years. Avoid growing too much brush in the top; cut back and thin out so as not to have the head too dense. As trees grow older there is less necessity for heading back. Prune the dwarf pears even more than the standard. If left without pruning the roots are overburdened and the trees die prematurely.

PRUNE IN THE EARLY SPRING,

preferably between March 15th and April 15th. It may be wise and necessary to do it in the fall and winter, on account of lack of time in the early spring; if there is ample time I prefer March and April. Fall pruning is said to develop the growth of the tree and there is no great objection to it with apples and pears; with stone fruits there is more danger of killing back. You may prune in the pleasant days of winter, and at any time in the fall after the leaves are off. It is wise to cut off the shoots to lessen the drain on the tree in developing pollen. This saving of strength promotes the setting and maturing of fruit. This early cutting off of shoots also aids in the much needed thinning of the fruit. In addition to this pruning peaches should be severely thinned to increase their size, and experiments have shown that apples can often be thinned with profit.

R. L. Taylor: After the exhaustive article by Prof. Taft I shall devote my attention exclusively to pruning and caring for grapes.

Grapes should be grown on every farm for the family consumption. They are easily grown; there is no mystery about their pruning. There are many different ways of trimming grapes but all are based on one theory. Keep the vine within bounds and do not allow it to overgrow the space marked out for it. Pruning is directed to producing stocky growth and fruit buds.

MY PLAN IS AS FOLLOWS:

In the first season I allow the vine to take its own course and run sprawling on the ground. My reason for this is that there is a strong tendency in all vines to carry the sap to the extremity of the branches to produce growth there; if the branches extend upward, the sap tends to the highest point, hence I leave the vine in a horizontal position in order that the sap may strengthen the buds near the base. In the fall I cut to two or three buds. The next year I let the strongest bud grow and train the shoot upright as far as I want it to remain permanently. This is usually five and one-half feet high. The vines may well be trained at an angle of forty-five degrees in order that they may be laid down during the winter, being covered up in the fall after pruning to save the buds. When the second year's growth has gone on far enough I pinch off the top and laterals except perhaps two arms.

In the third year I stretch two wires, one three and one-half, and the other five and one-half, feet from the ground and train out two arms horizontally on each wire. After the leaves fall, I leave five buds on each arm. The next spring no more branches are allowed to grow than are necessary to fill up the spaces, five on each branch being sufficient. Now I allow three bunches to grow on each shoot. The arms may be allowed to remain as a basis for the growth of the following year, or a new growth of the present year may be saved for the arms next year. If you choose the latter method cut off to five or eight buds and follow the same course thereafter. This is one system to be followed in trimming vines. The excess of buds is to be removed before the leaves start.

It is necessary to do this to insure stocky growth and strong fruit buds. The vines should be pinched off, after they have extended six or eight feet. All of these details must be attended to at the right time. They cannot be postponed. Grapes should be in every farmer's house for six months of the year.

Recitation by Mrs. Kennedy.

BUSINESS METHODS IN FARMING.

ROLAND MORRILL, BENTON HARBOR.

In assigning me this topic the State superintendent evidently had in mind the fact that there is urgent need of some radical changes in our methods of conducting our business, owing to the changed conditions under which we are at present operating. And that the subject needs handling without gloves seems apparent to any careful observer. I hope that the level-headed, sensible men gathered here will find some little good in my suggestions. At the same time I have no doubt but some over sensitive people may feel offended if I should chance to touch their vulnerable points. But facts are stubborn things and we must look them squarely in the face. First,

ARE WE BUSINESS MEN?

For some reason the public has never classified us as business men. Why I know not, unless it be that our slack methods do not entitle us to the name. But I cannot see why a man who buys sheep and sells their product is not just as much a business man as the man who buys and sells the wool from their backs. But that there is a difference, a vast difference, between our methods of conducting business and the methods pursued by business men is painfully apparent, and we are the sufferers by the comparison. In fact, I believe that if the merchants of Michigan should conduct their business in the same slipshod manner that we do ours, half of them would be bankrupt within a year. In fact agriculture in Michigan has in the past shown enormous profit when placed upon the same careful calculation that other business is, or our farmers could not have even retained their homes. But a change has taken place; yet "It is hard to learn an old dog new tricks," and I think it altogether likely we will have to look to the rising generation of farmers and the men who come into the business from other walks in life, for a new agriculture. These classes of men

FEEL THE NEED OF INFORMATION

and are eagerly searching out the best men and best methods and copying them. Such men when industrious, temperate, and honest, will succeed, and I believe that our present trying condition will

develop a class of men of this type who will in the future be the pillars of Michigan agriculture, and will lift the status of the occupation to the high and honorable position it is fairly entitled to.

SOME OF OUR FAULTS.

Now permit me to speak of a few of our common faults. It is not necessary to speak of our virtues, of which we possess the average allotment, no doubt.

1. Economy. "Waste not want not" is an old and trite quotation, but how many of us realize its full meaning? Not many. We are not an economical people. On the contrary we are the most extravagant people on earth. Some of you are thinking this a wild statement. You may be thinking of the nice things you have denied your family; the new buggy, the good clothes, the reading matter which you haven't bought. But I am thinking of something else. You are thinking of saving the dollar itself, and this thought has some merit. But I am thinking of *how to get* the dollar to *spend*—for an idle dollar is the "deadest" thing on earth.

True economy consists in handling such time and money as is at your disposal and in such a manner as to get the largest possible amount of pleasure and profit out of it. Now I have said we are wasteful. Let us see? Where can we commence? Well, fertility in the soil is

OUR PRINCIPAL STOCK IN TRADE.

And how do we care for that? Not very well. Few of us have learned that by intelligent and rapid culture we can make the nimble sixpence earn more than a lazy dollar. How many of us are saving all the fertilizers from our stables and applying where they will do the most good? Not one in ten. How many of us feed the grain and hay, made by hard labor, intelligently and without waste? Not one in twenty-five. There are still plenty of men in Michigan who put their corn, oats, and hay inside an animal, compelling it to keep up the fire of life against the winter blast on the outside and then "kick" because stock growing doesn't pay. All this in Michigan where lumber is the cheapest of any place in the United States.

Now, how about tools? Do we not sometimes invest our hard earned dollars in expensive machinery, then expose it to the action of the elements, which is harder on most machinery than service? Yes, we do, and you can see it any day, maybe on your own farm. If you are doing this, stop "kicking" and mend your ways.

WASTE IN THE DAIRY BUSINESS.

How many of us feed milch cows at a profit? Not one man in fifty can answer. Why? because he has not taken pains to find out. Yet every reading farmer in this State has been told repeatedly how he could find out just what each cow was doing. How many men in this audience would be willing to hand me a silver dollar each week and allow me to

return them 60c to 75c for it? Not one. Yet most of you are doing that same thing with from two to twenty cows. Am I not as worthy an object of your charity as a scrub cow? How many of you are selling butter at 8c to 10c per lb.? A majority, I will warrant. Yet Prof. Smith, Mr. True, and Mr. Brown have been telling you for years just how to make butter that will command double the price and not cost you a cent more to make, and they are telling the exact truth. Now, why don't we do it? We are either too stubborn or too shiftless. You have a right to tell me that it is none of my business, which is true. But my retort is, if you haven't tried to do better "stop kicking" about the price of butter. I quote from the *Detroit Free Press* of recent date the following, which shows that some of our farmers *or their wives* are waking up:

"Evidently some of the Michigan farmers' wives are learning to make good butter, as there is a noticeable amount of it on the market recently that grades as prime and finds a ready sale at 18c to 20c."

WASTED TIME.

I have mentioned only a few of the many wasteful practices on our farms. Now I wish to say a few words about wasted time. How many of us are regular workers? Not many. How many of us spend more or less valuable time on street corners or in shops, or even in saloons? A good many. How many of us plan our work so that it runs along smoothly and comes out on time? Only a few.

How many of us know just how the finances of this nation should be adjusted? Nearly all of us. Yet only a few can adjust a plow so that the draft is just right, or adjust a harness so that it will not gall a horse under heavy work? Strange, isn't it, that we should know so much more about questions that have puzzled the ablest men of all ages than we do about the little details of our own work? Not at all. Now

A WORD ABOUT SMALLER THINGS.

How many know how to make a clip with a hoe do the greatest execution? How many can husk an ear of corn with three motions instead of five or six? How many can chop a log off without cutting the chips twice in two? In short, how many of us have the hundreds of little details of our work down fine and then teach it to our boys and hired men so that they can return the maximum amount of product for the minimum amount of labor?

TRUE ECONOMY

does not consist in holding back effort or material, but in the employment of every available day and dollar in such a manner as to get the largest possible net return. And this is entirely a matter of detail which each of us must figure out for himself.

I have spoken at some length on the important matter of economy in the management of our farms, and now wish to call your attention to

some quite common weaknesses concerning matters in which the public have some degree of interest.

BUYING SUPPLIES AND SELLING PRODUCTS.

We all agree that our dollars are earned by the hardest possible knocks. Yet when we spend them what wild "breaks" we do sometimes make. Suppose for instance we have concluded to set a few fruit trees. Some of us have been so busy settling the destinies of the nation, reading love stories in the *New York Weekly*, that we really have not had time to look up suitable varieties, or even to learn who is growing the trees we want. Of course there are reliable agricultural papers devoted to our business, but you know many have supreme contempt for fancy farming. They don't want "book farmin'," "kid glove farmin',"—or as one very prominent farmer in a neighboring county expressed it, they are "agin' them college fellers travelin' around at State expense in their *sackcloth and fine linen*, tryin' to tell farmers how to farm." But we are the very chaps that the gay and festive tree agent seeks, and finally gets our name on an order at 30c to $1.00 per tree for trees that any reputable nurseryman, who advertises in these agricultural papers that "we cannot afford to take at $1.00 per year," would gladly sell us at 8c to 20c each. Then you remember the Bohemian oats man and the lightning rod man. These faults are not common but occasionally do come to light.

SOME COMMON LOSSES.

One of our most common losses occurs in the universal demand for something cheap, which has compelled manufacturers to build of the poorest possible material many of the articles intended for "farmers' trade." This is unfortunate, as it is one of the greatest leaks we have in our business.

We are sometimes very wasteful in caring for our products, and meet with losses easily prevented by the exercise of a little judgment, and frequently our product is inferior, from the same cause. There is plenty of material in this subject alone for considerable figuring on most farms. "A crop well grown is half sold," is an old and true saying. But it certainly seems to me that the question of purchases and sales could be handled to great advantage if we could organize in clubs or granges and make it an important feature of our work. Once organized the ways and means should suggest themselves. Now let me speak a minute on the subject of

CULTIVATION.

A large percentage of us do not know the capacity of an acre of land—we are spread out too thin. We do not as a rule fit our land good enough before planting crops, then we do not give good culture afterwards. It requires a certain amount of crop per acre to pay expenses, while all above that is profit. And the man who cultivates in such a manner as to just get expenses or a little less must in the course of time lose his property, while the man who understands this fact and works accordingly will

continue to be a winner even though at times his profits be small. We are plowing too much land in Michigan! Better put more of it to producing grass and stock and cultivate less acres and better.

Now a few minutes plain talk about some very common defects in the characters and personality of many of us.

PROMPTNESS AND CREDIT.

I know of no man, taking a class, who fails so utterly in the matter of promptness in his transactions as the average farmer. He is seldom on time in attendance at public meetings, or in appointments made. If he agrees to meet an obligation at a stated time he usually has to be reminded of it or he fails to be on hand. And we are apt to make promises that we see no way of fulfilling or make no special effort to do so after making them. This is entirely wrong and has gotton us into bad repute. It also affects our credit, which is today essential to most men who are trying to do business.

Are we self-reliant? Not as a rule. Many of us know of the leaks in our work and have a pretty good idea of the better way, but do not act, frequently excusing ourselves by saying that we cannot do what other men under similar conditions are doing. We lack courage and lie down and cry, figuratively speaking, when we should be up and hustling hard.

Did you ever stop to think what bad advertisers we are? There are no doubt many men in this room who have been telling that their farm was running them in debt for the past two or three years, at the same time trying to sell their farm. Don't you know that such a course has much to do in discouraging sales of farms and lowering farm values? You say it is a fact and cannot be hidden. True, but why shout it to the four winds? Why not instead spend some time hunting up the various leaks on your farm and repair them? You may say that it can't be done. Nonsense. You know that this State has a vast number of farms on which the original owners have starved off and lost their farms just because they formed their farming habits when their principal crop was saw logs and wood, and when this crop was gone had not gumption enough to take up the changed conditions and make a living. But some other man takes the land, puts things in shape, and makes a success of farming. You can find such examples in nearly every neighborhood. What has been done can and will be done again. But in order to make a success today a man must get knowledge. And what are we doing in that line? Not much. The very best agricultural papers in this country have circulations of only 20,000 to 40,000, while some trashy ones have 200,000 to 300,000. Farmers' institutes are being held all over this State, yet only about one farmer in ten attends them. Evidently they do not want any more knowledge.

THE MATTER OF COMMON HONESTY

is a delicate subject, but I thing it best to look the matter squarely in the face and acknowledge that we do not average as honest as we ought to be. I know somebody will attack this statement, but no amount of denial can change the facts and the public are fairly " onto us " and know all our

mean little tricks. If we load our fleeces of wool with salt or land plaster, somebody knows it. If we sell fat stock, then salt and water heavy just before weighing, everybody around knows it. If we doctor our maple sugar or syrup with cheaper sugars, we are not honest. If we pack apples with selected specimens on the ends and poor stuff in the middle, and the commission man keeps all he gets we are not entitled to sympathy, for we started out to beat somebody and got beaten. "Served us right." Just so with any other fruit or product. If we sell a neighbor a plug horse, representing him as sound, or lie to him in order to sell him the poorest cow on the place, we are no better than the midnight thief. Yet some of these things are done every day; and it does not seem to make much difference what men's social or religious positions are, there is but a small portion of them that can be trusted implicitly under all conditions. This is unfortunate but true.

THE OVERWORKED WIFE.

How do our family relations compare with other people's? I don't know, but I do know that there is chance for improvement in this line. The farmer's wife does not as a rule live a happy life, although there are some noted exceptions. She usually has imposed upon her the double duty of raising a family and doing all the housework *as long as she can stand it*, and we find her prematurely aged, bent and careworn. Statistics show that the farms furnish the majority of the inmates of our insane asylums, and it is no wonder. There is a limit to human endurance and the farmer's wife is often forced beyond that limit by the requirements laid upon her by us, the lords of creation. And for some reason many a well meaning man does not awaken to the consciousness that he is ruining the life of the best woman he ever knew until it is too late. She breaks down and dies, or plods through life a hopeless physical wreck.

Next, how do we appear to the boys and girls we are raising? Do we suffer by comparison? Can our boys watch our every day acts and find in us their high ideal of honor and truth, or do they find in us some of those mean contemptible little tricks so common among farmers? If we cheat a neighbor in a horse trade or sell him short measure; if we deceive the buyer of our products in any way or even attempt it, our boys see, and do you think they have much respect for the *old man*? Not much. Do you think that any boy having the stuff in him that good men are made of will fall in love with a life that he sees full of such things, or do you think he will want to leave the farm at the first opportunity?

PERSONAL HABITS.

How do our personal habits compare with other people's? Not very well. While some of us have some regard for our personal habits many seem to have none. Now for fear that you may think that I am not fair in this statement, I wish to call your attention to facts too apparent to be overlooked. In this hall are nearly 1,000 people, largely farmers and their families, but a fair sprinkling of city people. Now there are men listening to me who have the accumulations of dust and sweat of last

September on their bodies from their ears to their heels, and whose shirts would disgrace a Chinese laundry and their presence would be apparent to a blind man in this warm room by that awful *seal brown* odor that prevails in their vicinity. Look them over, please, and see if you see any of the merchants or business men of this town among the number. Another thing, I presume there are men in this room who have on rubber boots, with their pants tucked into the tops, at least they ought to be so fortified as they are now busily engaged in flooding the floor with nasty tobacco filth for the ladies and gentlemen to jump over or wade through as they please. Look them over, if you please, and tell me if you have found any city business man doing this. If you do I will take back nearly all I have said. Now friends, don't think for a moment that it is pleasant for me to say these things, but I am expressing the sentiments of every lady and clean man in this audience and hope that instead of giving offense to the few men that I refer to, that they will *tumble to themselves*, go home, have a matinee with soap, soft water, and scrubbing brush, then repeat the dose as needed, and never go into a public hall or even a cow stable with a quid of tobacco in your mouth. We ask this of you for the sake of the general reputation of our calling.

CHARACTER AND REPUTATION.

We make our character and our neighbors make our reputation.

You have all heard the "Golden rule." Well, paste it in your hat, read it often, follow it carefully, and your conscience will let you rest nights, and your neighbors will give you that excellent reputation that is of so much value in our business transactions.

Why is it that we cannot always rejoice at a neighbor's prosperity? I am sure I don't know, but it is a fact that a farmer who by careful attention to business becomes very prosperous, becomes at the same time a target for the shafts of envy and malice of some of his less fortunate neighbors. Now, it appears to me to be a better business method to get just as close to him as possible—learn his methods, and adopt all of them that we can to advantage.

The query may arise in your mind as to what many of the things I have spoken of have to do with business methods. My reply is that business advantage is quite largely a matter of friendship and clean reputation, and I do not think I have brought up any question in which there is not room for improvement. And only through improvement can we hope to gain the desired business advantage.

THURSDAY AFTERNOON.

Roland Morrill of Benton Harbor in the chair.

DOES IMPROVED LIVE STOCK PAY THE AVERAGE FARMER OF TODAY?

HON. WILLIAM BALL, HAMBURG.

This question can be answered in the affirmative and as truthfully in the negative; depending mainly upon conditions and their applications. By improved live stock is meant a grade of stock better than the ordinary or native stock (so called) that too generally abound throughout the country, and not necessarily of the thoroughbred sorts excepting the males used for breeding purposes, which should *invariably be thoroughbred.* The prices that have prevailed through the past winter and are still prevailing for nearly every kind of domestic animals if properly bred and properly fed have been a source of profit to those breeding and feeding them. It is equally true that large numbers of cattle, sheep, swine, etc., sold have been a source of loss to those receiving and disposing of them. The difference in prices received for milch cows in the Detroit market as well as in Chicago, Buffalo, and other markets prove conclusively that if the better prices received for the better sorts pay some little profit beyond the cost of production, those sold at the lower prices which have cost in many instances more to produce, owing to the longer time required to bring them to maturity, must have been a source of loss to their owners.

PROFIT AND LOSS.

If the cow which brings from $40 to $45 only gives a fair margin of profit to the producer, the one selling for $25 or $30 proves a severe loss to its owner. The prices in Detroit for beef cattle have varied from $2 to $4 per hundred pounds, according to weight, conditions, and quality. If a fair margin of profit is received from the sale of the better sorts, there is invariably a loss on the sale of the inferior ones. The difference noted in the sales of cows for milk purposes and cattle for beef, is also noticeable in the sale of sheep and lambs to quite an extent. The profits only come in the sale of the better bred and better fed ones and the losses invariably come from those of inferior breeding and feeding.

The prices received for swine are more generally alike, the difference mainly due to heavy or lighter weights, though breed and condition have much to do with them. The reason that the prices for swine vary so little as compared with other kinds of stock sold is mainly due to the fact that

improvements in stock breeding are more generally recognized in hog production than in any other breed of domestic animals, and also to the fact that nearly every farmer recognizes the fact that a hog to be profitable must have that kind or kinds of feed requisite to early maturity and rapid growth. Right here is a well established fact that profit in swine breeding depends upon what has already been said regarding profits in breeding cattle, sheep, etc., namely,

BREED, CARE AND FEED,

and which are so generally disregarded by many when applied to cattle, sheep, and poultry production. In these times of stringency and discouragements I would not advise farmers to sell the females they have on hand for what they might get and run in debt for the difference required for better ones. But what I would suggest is that no male be used that is not a good thoroughbred of its kind, knowing that from the scrub a half full blood can be secured on first trial which if a female and kept for breeding purposes will when properly bred bring a three-quarter blood, which in turn can be made to produce a seven-eighth blood—high breed enough for all practical purposes. This process, coupled with intelligent management in feeding and care, will result in profits at present and prospective prices for cows for dairy or beef purposes, sheep for wool and mutton, swine, and poultry for eggs and for market. The same rule in a degree applies to horse breeding, though endurance, strength, trading qualities and speed belong especially to the horse.

WINTER CARE OF STOCK.

Large numbers of cattle, sheep, and growing horses weigh less in April than they did the November preceding. This being true, the farmer to whom this truth applies spent his time in the preceding summer, use of land, wear and tear of teams and machinery, hired help, board, etc., in securing food, with the necessary time, use of buildings in its distribution, simply to sustain animal life and that life impaired by a course of decay where thrift and improvement ought to have prevailed.

Farmers grumble at the hard times. Such farmers will always have occasion to bewail losses while their neighbor farmers with no better farms, environed by the same conditions, who use intelligence in breeding, feeding, and in caretaking, will have profits taking the places of their careless neighbors' losses as well as improvements in their domestic animals. These differences are attributable to the farmers themselves and to no other cause.

It is said that every farmer cannot have recourse to or own a thoroughbred male. This need not be true to any great extent. If every farmer cannot afford to have a thoroughbred male a neighborhood can, which is sufficient. The time is at hand when if farmers succeed in making a profit on the stock they sell they must avail themselves of all the aids to improvements within their reach.

ONLY IMPROVED STOCK PROFITABLE.

And to emphasize what has already been said the stock kept in the future to be profitable must be of the improved sorts. More care in preparing food must be used, more thought and study be given to the natures of the animals raised, their requirements, and what is necessary to bring out the possibilities in the animals we breed, if we are to meet intelligent competition and receive benefits. That feeder succeeds best who takes into account the needs of the animals he feeds, the purposes for which he feeds, and the probable results. No two animals require the same amount of food and frequently not in the same quantities, and the feeder who can meet these different requirements in the best manner will be the feeder who will succeed in the most satisfactory manner. Growing animals to be properly grown should weigh more every night than on the preceding morning. This necessity cannot be secured by thoughtlessness and carelessness.

These thoughts are more important from the fact that as a rule every farmer who owns a farm and is engaged in mixed husbandry is obliged to have horses, cattle, sheep, swine and poultry. He must have horses to do the work on the farm and the traveling on the roads. He must have cows for milk and butter for the family and should have something in the form of butter, beef or heifers for the dairy to sell. He must have swine for pork and lard for home consumption and he should have some for sale every year or twice a year. He must have hens. The eggs and flesh are necessary for family use and enough eggs to sell to buy sugar, coffee, tea,—but not tobacco. Sheep are also a necessity upon nearly every farm. If bred for wool and mutton there is a return twice each year in the sale of wool and lambs for market.

These different breeds of domestic animals are a necessity upon every well regulated farm where diversified farming prevails, and by having a surplus of each variety to dispose of yearly it seems to me that no year will pass but that most of this surplus will bring remunerative prices if the above described conditions are adhered to. The size of the farms and their capabilities will in a degree control the numbers to be kept of any or all kinds of animals. No more of any or all kinds should be kept than can be well kept and comfortably cared for. Breed and feed are twin workers in the march of improvement. Neither will succeed without the help of the other.

BY CAREFUL SELECTIONS IN BREEDING,

accompanied with judicious feeding, the ordinary stock in a few generations will become well bred and a good animal. The best thoroughbred stock by carelessness in breeding for a few generations and improper feeding and care will become pedigreed scrubs and worthless to the owner.

Two cows well kept are worth more than three cows poorly kept, and the cost of keeping one is mostly saved. A cow that will not when well fed and cared for make a pound of butter per day for from seven to ten

months in a year is not a profitable butter cow. A steer that when properly bred and properly fed will not weigh when two years or two and one-half years old twelve hundred pounds and bring the top price in the market is not a profitable steer to raise. Sheep kept principally for wool that will not shear from ten to fourteen pounds of wool unwashed are not profitable sheep to own. Those kept for wool and mutton should shear from eight to ten pounds and raise a lamb to a ewe if profiit is to be secured. A pig to be profitable should weigh at the age of seven to eight months two hundred pounds.

The above results are within the reach of the average farmer and he should not be satisfied with less. Stock enough of all kinds should be kept to consume all the hay, oats, corn, rye, and roots grown upon the farm. These grains should all be sold in the form of wool, mutton, pork, beef, butter, cheese, and poultry products, or in surplus horses.

RESULTS.

Improved fertility of the farms, improvement in both man and animals, balance on the right side of the ledger. Better methods in farming; more systematic management of the farm and stock kept thereon; gains where careless methods insure losses. A better employment of valuable time; more means to improve the farm; more money for books, magazines, and papers, a proper reading of which means improvement of the farmer and his family. A security against bankruptcy.

DISCUSSION.

LED BY PROF. H. W. MUMFORD, AGRICULTURAL COLLEGE.

The consideration of this subject naturally suggests four lines of thought:

First, What is "Improved Stock?"

Second, How was it improved?

Third, What special care does improved stock require, if any?

Fourth, How can the average farmer secure improved stock, if desirable?

WHAT IS IMPROVED STOCK?

If we study the improvements brought about in our better farm animals we will find that much of the improvement has been brought about both directly and indirectly by pure-bred stock. If this is true, and the evidence strongly points to such a conclusion, then pure-bred stock must have a place,—must bear a most intimate relation to profitable stock raising on the farm. What we wish to bring out in this discussion is just what relation pure-bred stock should bear to the stock raising of the average farmer.

HOW WAS IT IMPROVED?

To be sure, many of our leading breeds are, as we might say, a natural outgrowth of their native homes, yet, even in such instances, we find that man has had some definite idea in mind in building up a breed which should be especially fitted to supply some special product which was demanded by the market. As a result we find breeds which have become especially adapted for the various uses to which farm animals are put.

We should not overlook the fact that these triumphs of the breeder's art, the improved breeds, have become possible only by supplementing the naturally favorable conditions of soil, climate, etc., which have surrounded them in their native homes with the most approved methods of care and management.

WHAT SPECIAL CARE DOES IMPROVED STOCK REQUIRE, IF ANY?

Just here permit me to say that it is our opinion that a very large number of men have branded pure-bred stock as unprofitable,—because they have failed to recognize the fact that improved stock is, in a measure at least, the logical result of better or improved methods of feeding,—better care. These men having failed to furnish such favorable conditions under which the pure-bred animal has been developed and brought to its high degree of excellence, the animal has at once deteriorated in quality until it might be said it is no better than a native.

It should be remembered once for all that improved stock will not thrive under neglect. If a man wants a class of farm animals which will thrive with neglect, the nearer he gets to the native scrub the better.

Yet, as farmers, we do not want animals which must be pampered and petted, but those which are hardy, with strong, vigorous constitutions. Neither do we want animals which will thrive with neglect. What we want is an animal which will quickly respond to good care and keep, and not only with good individual excellence but also one which is well bred. One with a good pedigree, if you will.

Now we have so fallen into the habit of thinking that an animal with a pedigree is a pure-bred animal that we forget that every animal has a pedigree whether pure bred or not. In other words, when we say an animal should be well bred we do not necessarily mean that it should be pure bred, but we do mean that its ancestry should be good. It is not enough either to know that a pedigree traces back to Abraham,—it is equally important to know that the immediate ancestors, the parents and grandparents, were meritorious individuals.

HOW CAN THE AVERAGE FARMER SECURE IMPROVED STOCK, IF DESIRABLE?

We have attempted to show the important part which good care and keep have played in the development of our improved breeds, let us now urge the fact that the farmer should extend this same good care and keep to the common stock of the farm. I think that it is safe to say that the immediate effect of better care among common stock will be more

noticeable in their improvement than in pure-bred stock. While neglect will cause a seemingly greater deterioration of quality in improved than in common stock, continued good care of common stock for a series of years will, in conjunction with intelligent breeding or mating, produce what might be termed improved stock.

It would not be profitable for a very large number of our average farmers to go into the breeding of improved stock, because their market is the butcher, and under present conditions with most varieties of stock grade animals can be produced at a greater profit than pure-bred stock if the ultimate market is the butcher, which is true with the average farmer. The principal place, then, of pure-bred stock in its relation to the farmer is as an improver. If there is a variety of stock which the farmer can afford to keep pure-bred it is pigs. Perhaps in no other one variety of stock is the value of good blood so manifest as in the hog. Then, too, a well-bred sow of any of the leading breeds can be purchased with the outlay of but little more than what would be necessary to procure a grade sow, and the extra price received for the first litter would usually cover this expense.

Breeders of pure-bred stock have taught at least two things: First, that extra care and attention do much to improve the quality of live stock; and second, that improved stock feeds more profitably than unimproved.

For these and other valuable lessons the farmer is indebted to breeders of pure-bred stock.

Secy. I. H. Butterfield: I define improved stock to be the class of animals that will make the most money for the food consumed. We have in the past made too much of breed lines. Different breeds represent to us collections of animals closely resembling each other and representing the development to a high degree of certain valuable qualities which are perpetuated from generation to generation with increased power to stamp these characteristics on their offspring. Usually the breeders along certain lines have sought out the most desirable qualities as the ones to be selected and perpetuated. Sometimes, however, they have gone into side issues, as the red color in Shorthorns or the solid color in the Jersey; fortunately, however, this is uncommon. Jersey breeders have selected their cattle and so bred them as to produce the modern Jersey cow, distinguished for her ability to yield milk and butter. The breeders of Herefords, Angus, and Shorthorn have developed in their animals the form and characteristics which enable them to lay on large quantities of beef where the butcher most desires it. The markets recognize both classes of animals as improved live stock, although bred for different purposes.

One of the chief characteristics of improved live stock is early maturity. Well-fed two-year-olds bring the highest price among steers. Moreover, this growth has been accomplished in the shortest time and consequently at least expense. Among sheep, also, the smooth, fine-boned, well-finished lamb brings the highest price at ten months if of the improved stock, and you can get such a lamb from the improved stock only. What is true of steers and lambs is true of pigs and even horses, viz., that early maturity is a characteristic of the improved breed. A first-class draft or carriage horse costs no more to raise than the plug which will not bring thirty per cent of the price of the better one.

In this connection it must be remembered that while it costs no more to keep improved stock than poor ones, they do demand better care and more skill and judgment in their breeding. A less number of animals, however, is required to accomplish a given purpose, and hence the aggregate cost is made no greater by the improved care required.

For the general farmer, improvement in his live stock is to be sought along the line of purchasing the very best males and grading up. If you are to begin with pure bloods, do not buy on the basis of pedigree only, but select on the merits of the individual animal as well. While a pure-bred herd would be better than a grade one, still the latter can by careful breeding soon be brought to a state of perfection that will make them compete with thoroughbreds as far as the production of materials for market is concerned. We have not continued this breeding far enough in most cases and are too soon satisfied with grade. Too often, also, we have bred injudiciously, like breeding Jersey grades to Holsteins, thus imparing the butter qualities and getting a mixed progeny usually of very unsatisfactory quality.

In conclusion we say that the improved stock pays better than unimproved. It does not follow that it will pay to grow three cent beef or ten cent butter, because there are times when grain is worth more than the animal products; but when we compare the improved live stock with unimproved we find that the animal that produces the most product is the most profitable.

Jotham Allen: If thoroughbreds are the most profitable, why not everybody keep thoroughbreds? Why attempt to grade up? If thoroughbreds are worth more in the market they certainly are the most profitable.

Wm. Ball: While every farmer may and should improve his stock, not every one can breed thoroughbred animals because they have neither the buildings nor experience to make them successful in that line of business.

The improvement of thoroughbreds must be made by the few in the future, as it has been in the past. As has been suggested, improvement of the herd of the general farmer is going to come from the use of thoroughbred males. As the prices for live stock gradually rise, the breeder of thoroughbreds will reap the profits of his foresight in keeping up the quality of his stock during the hard times.

QUESTION BOX.

Q. What hay fork is the best to clean the hay from the rack or the barn floor?

A. Slings.

Q. How do Duroc-Jersey hogs compare with other breeds?

H. W. Mumford: Duroc-Jerseys are, as a rule, more prolific, hardy and contented than other breeds. They mature early if you select the right strain.

Q. Please explain the Farm Home Reading Circle of the M. A. C.

H. W. Mumford: This circle was organized to suggest and furnish the best books on agricultural topics to farmers and their families. Anyone can become a member without cost by sending his name to H. W. Mumford, Agricultural College, Mich., thereafter books will be furnished him at wholesale.

Q. What is the worm that troubles the ears of corn by going into the silk end of the ear and while in the milk stage?

L. R. Taft: It is the common corn worm or cotton-boll worm. There is no remedy.

Q. What kind of cow peas is best for the Grand Traverse region, and how much should be sown per acre?

R. M. Kellogg: There are several varieties of cow peas, but I would suggest for your section, the Whippoorwill, as it is the earliest, and therefore the best. For plowing under, I would sow from one and one-half to two bushels to the acre. You can get the seed of the Kelly Seed Co., Cleveland, Ohio, or you might try the Plant Seed Co., of St. Louis, Mo. They were comparatively cheap last year, but are high in price now because there is a large demand for them. These peas are great nitrogen gatherers, equaling in that respect the field pea, if not exceeding it. Their roots are thickly covered with the little nodules which gather the nitrogen from the air. They have a large number of very long roots, and hence are of great value in storing up nitrogen in the soil.

Q. Is there ever danger of stimulating too much growth by heading in?

R. Morrill: I suppose the question refers to peach trees. In that case there need be no fear. Use May, June and July to grow the wood and the fall months to ripen it. Give the best of cultivation in the spring and quit in August to allow the wood to mature.

Q. Is the moisture which Mr. Kellogg conserves by cultivation in times of drouth sufficient to keep the ground moist in a corn field, as in case of a strawberry bed?

R. M. Kellogg: If the strawberry plants are not in a matted row, and you can get up close to them and can cultivate almost the entire surface of the ground, you can retain a sufficient amount of moisture in a strawberry bed to produce the crop. This can hardly be done with a matted row. Corn makes a greater draft on the moisture of the soil than strawberries; still if the ground be saturated in the spring and the cultivation be thorough and shallow through the season, a crop of corn can be produced almost if not quite without subsequent rain.

THE FORESTRY PROBLEM IN MICHIGAN.

DR. W. J. BEAL, AGRICULTURAL COLLEGE.

To those who were present at the "Round-up" held at Grand Rapids a year ago, this subject as just announced will sound familiar. I had presented this problem at Institutes in over twenty counties, and in every case the people seemed to approve the suggestions then made. I had supposed few would think the subject worth considering, or if they thought it was of any account, they would suppose nothing could be done to improve the old methods—or rather the old lack of method in caring for forests.

The people agreed that something should be done to save the young and very small timber now considered of no account by many people. They agreed that more attention should be paid to burning tops and rubbish in a careful manner to prevent injury to the timber that is left. They agreed that there should be a State forest commission who should have means to look after the fires, and study the forests in a most thorough manner. In a word, organize.

They seemed to see that Michigan so prominent as a timber State was falling behind neighboring states east and west of us. They acceded to the statement that this was too important a matter throughout the State to be left entirely to the whims of people, many of whom were thoughtless or ignorant of the best course to pursue. They agreed that there had been an enormous destruction of young timber, and that the loss of the leaf mold was by no means insignificant. They agreed that our forests were suffering for more students who were capable and interested in trees and their needs.

During the past winter I have attended Institutes for about four weeks and in each county this problem was presented and the same sentiments expressed by the people as last winter, and the winter before.

The fact that three bills covering this subject have been introduced by members of the present legislature indicates that our people believe they have neglected the needs of our forests too long and have resolved to begin a reform.

THE FOREST PRIMEVAL.

I need not attempt to describe the beauty, grandeur, and value of our forests as they existed 30, 40 or 50 years ago, as there are many here today who still retain in their minds vivid pictures of the scenery of those days. Most of those trees could not have been saved and at the same time the land support a prosperous people. The trees had to be harvested; much of the land was needed for homes, for broad acres on which to grow grain and grass.

You who have traveled through four or five tiers of counties in southern Michigan, and in some counties much farther north, will agree with me that the most of the timber left standing presents a dilapidated

appearance. The trees are thin, lonesome, dying at the top, and insects and decay are on every hand gnawing at the trunks.

The little wood-lot stands at the back end of the farm as a shady pasture without undergrowth. The grass is constantly gaining and the trees losing. As ex-Governor Rich said, "A crop of good trees and grass cannot both be grown at once on the same land."

Another reason for the decay of the tall trees is this: The trees which grew near them for most of their lives have been removed, leaving some with unusual exposure to sun and wind.

The only sensible thing to be done now is to cut off such forlorn pieces of woods by degrees and start new.

Where there is little grass, keep out all live stock and permit the growth of seeds and seedlings, and keep fires from spreading. Remove the dying and poorer grades of trees, favoring thrifty growth of the most valuable kinds.

Ottawa county more than a year ago organized a county society to work in the interest of forestry and good roads. There have been held at least two excellent meetings, one of which I attended.

Some of the members are occasionally contributing to the local papers.

HOME WOOD-LOTS.

This is well to read and write and observe, but it would be still better if we could see in numerous neighborhoods some persons who could afford it and who like to see experiments going on, begin growing trees for a new wood-lot. This once seen, others would likely follow, because men are imitators and follow the fashions. Select a small piece of land, perhaps a rough piece, and begin planting seeds or small trees. Plant a few in the spring, if possible, in rows like corn, if planted on arable land, and cultivate occasionally during the growing season. This piece may contain a strip of a few rods, half an acre, more or less, according to the means and enthusiasm of the farmer, and it may be well to plant in such a place that additions or extensions can be made in later years if desired. This will be something tangible, something to admire and talk about and show your family and your friends. The trees will grow while you are busy with other work; you won't have to sit down and wait for them.

How long it takes to wait a few minutes for a pot to boil, or an hour for a delayed train, but if you have something interesting to do during the while, the time passes too quickly. No one can tell the farmers just how to carry out all the details of this work, and this is one of the reasons why some should begin and why they should begin on a small scale.

SOME SUGGESTIONS.

I venture a few thoughts that may not come very wide of the mark. Every farmer knows what kinds of native trees make valuable timber and which grow fast and which slow. He knows what grew well on the land or on similar land before it was cleared. These are the best hints for selecting the species. Mix up the trees in various ways instead

of planting solid blocks to one kind only. It will not be safe to rely on exotic trees for general planting, as experience has proved that most or all of them are unreliable. The following are a few of the best trees, providing the soil and location be favorable: White pine, Norway pine, white oak, white ash, chestnut (if this tree is known to thrive with you), red oak, basswood, hickory, and probably several others.

These may be planted 8 to 12 feet apart each way. For from four to six years plant potatoes, corn or beans or some hoed crop between the rows, then plant a lot of small box elders between the rows, so that all rows are four feet apart. The box elders grow rapidly and will soon shade the ground and cultivation may then cease. If the box elders overtop the most desirable trees, hack the tops off more or less, leaving sprouts to come in. The box elders are not valuable, except for shading the ground and crowding up the other trees. Buy of some wholesale nurseryman the pines, one foot in height. For oaks, chestnuts, hickories, basswoods, plant nuts before dry where the trees are wanted, or keep the nuts buried in boxes or baskets over winter in an equal bulk of sand and plant in spring. A single small plantation would soon be well known for miles around and would be an educator of the best kind. If some mistakes be made, as there doubtless will be, these will be as instructive as the successes. As time advances, report the results to your grange or club or the neighboring papers.

Look over your present wood-lot, and if it seem worth saving for a new crop of trees, and there are some thin places, fill in by planting a few nuts or seeds or little trees.

After the Satterlees, father and son, of Greenville, had grown a grove of chestnut trees for seventeen years a report was made stating that there was no profitable return of nuts—that one crop of potatoes on the ground would be worth more money than all the nuts ever harvested. After ten years more had gone, the Satterlees make a different statement; that the yield of nuts has become valuable.

FORESTRY AT THE COLLEGE.

Something has been done at the Agricultural College. An acre and three-quarters of many sorts of trees, a few of a kind, were planted by my own hand twenty-one years ago. This I consider one of the wisest things I ever did, though it required some intriguing to get possession of the small piece of land for the purpose. More recently plans have been adopted to plant larger areas to trees, and to manage the remaining wood-lots as well as we know how.

Now that everybody agrees that it is time the State of Michigan were doing something, it seemed to me that the most profitable part of this hour would be devoted to a discussion of the kind of law we should like to see enacted by our present legislators.

Some have argued that the land was worth more for growing wheat than trees. Doubtless this may be true in many cases, but there may be a limit to this rule. We shall always need more or less timber for certain purposes, no matter how abundant the substitution of stone, bricks, iron and steel. Some trees are needed to protect our crops of grains and fruits, to furnish comfort to man and beast, and in this

day may we not claim there is need of trees by way of rendering the country more beautiful? I shall not discuss this question at this time.

The very fact that the State was at one time so well clothed with a growth of excellent timber is proof that the soil and climate are admirably fitted for growing trees. Apparently a considerable portion of our stump lands are worth more for growing trees than for anything else and the remaining portions kept in cultivation would be more productive on that account. There are calls for the reduction of taxes, but is it wise to leave longer the care of our forests and stump lands to chance or to thoughtless persons?

To establish a commission with plenty of money to use and plenty of politics included, with the chances that the workers on the subject would be changed every two to four years, would be fatal to success. It would be far better to start out with a small sum, with the expectation that the State would get two or three dollars' worth of work done for the expenditure of one.

In these times I doubt not that in consultation our most enterprising lumbermen could devise plans and would in many cases agree to try the experiment of preserving from destruction the timber too small to be profitably cut for use.

FOREST FIRES.

The whole subject of forest fires in all its phases should be thoroughly studied and if it be found impracticable or impossible in our climate to make it safe to attempt the growing of trees as a business, then the quicker we know the fact the better it will be for all concerned, but judging from what has been done in other and older countries, the fires can be largely prevented.

I am sure we need a system of fire wardens, especially in the newer counties, with a limited amount of money at their command to pay for services rendered, but these fire wardens, however useful, could not be expected to devote much attention to the more intricate problems connected with forestry. We need to make some provision whereby a few competent persons shall give considerable thought to this subject for many years to come.

A COMMISSION NEEDED.

A commission consisting of the members of the State Board of Agriculture could do this work well, but it might be better to secure also the active coöperation of the State Horticultural Society and State Academy of Science.

It has occurred to me that a selection of three (possibly five men), one selected by each of the organizations above mentioned would be about the thing. One member to serve six years, one to serve four years, and the other for two years, with successors in each case to serve for six years. This commission would not be of a political nature and would likely be more stable in its work than if the selections were made at a State convention every two years. They should have the privilege of appointing or nominating a chief fire warden. Perhaps it would be wrong, but why should not such members be granted small pay for each

day in actual service, as is the case with most other boards of the State. One or more suitable pieces of State land, perhaps stump land, should be selected on which some economical and modest experiments may be attempted, not expected to make any display of importance for many years to come. If much were expended on such land, or much ado made about the enterprise, our impatient and driving people would soon begin to complain that there was nothing of importance to show for the outlay of time and money, not understanding that it takes trees some time to grow.

This commission with a little means at command could prepare and distribute small bulletins or a small journal for young as well as for those who are older. They would be expected to inform and advise people on the subject of forestry in all parts of the State, not only by bulletins and contributions to the papers, but by furnishing lectures for Institutes, and occasionally for schools and colleges. Suitable programs for use on arbor day would tend to arouse an interest in the young, and after trying the experiment of a good commission for a few years, we shall all wonder why we delayed the good work so long.

DISCUSSION.

LED BY HON. C. W. GARFIELD, GRAND RAPIDS.

The world is treated to a spectacle today of seeing two hundred thousand Spaniards trying in vain to conquer a few Cubans. They are unable to accomplish their purpose because of the degeneracy of the Spaniards, and this degeneracy is due to the ruthless destruction of the forests in the once prosperous Spain. We ought to learn the lesson so plainly taught and not compel our posterity to suffer for our wilful ignorance. This tree destruction has been going and still is going on in Michigan to an alarming extent. A man sweeps off a thousand acres of woodland and then goes outside of the State to endow an institution of learning. He has not met his account with the State or with God; there is a settlement to come when you think that he has devastated one thousand acres and left a trail of fire to devastate thousands of other acres. These ruthless destroyers do not care. We must care. We must settle these questions now. The legislature or the citizen that does not consider the forestry question is behind the times. The question is as important as that of the deterioration of the soil, with which indeed it may be intimately connected. One trouble with us is that we do not know anything about intelligent reforestation. How shall we go about instructing the people on this important question? The publication of bulletins and instructive articles alone will not do. We must plant somewhere in the State an area of forests and watch them grow. It is worth more to have one mile of good roads in a county than all the literature that is published; so in reforestation we need examples much more than we need precept, much as we need the latter.

I have planted six acres to forest trees just for fun, and in doing so have made many serious mistakes because I did not understand the busi-

ness. I planted trees in blocks, each variety by itself; hence I have large trees of some varieties, while others that needed their shade, like the beech, have hardly grown at all. The box elders should have been mixed with the other trees, as they are excellent nurse trees. There are a thousand questions whose answers we do not know. In foreign countries they make a study of these matters and know how to increase the forest areas most quickly and advantageously.

In Michigan our farms have too much horizontal area and too little depth. There is plenty of land that could economically be devoted to the growing of trees, land useless for other purposes. Adding to our forests will not lessen our agricultural exports.

These forest areas act like sponges to absorb and hold back the water, allowing it to run down our little streams throughout the whole season. When they are cleared away, the snow melts rapidly and with the water from the spring rains rushes down the bed of the stream in a mad freshet. Our forest then has a general economic value. The bluffy banks of many of our streams are now totally useless. They might be utilized and beautified if permitted to grow trees.

Moreover, there is a real increment to value of land in forest. I have seen a Douglas spruce forty years old, eighty feet high, and three feet in diameter. Many other of our valuable timber trees grow rapidly and make a reasonable return for the investment. Naturally one cannot realize from such an investment at once, but a ten-year-old plantation has a very decided value because of its prospective returns. Such returns, while delayed, are sure. We educate our children and are wise in doing so, although we know that we must wait fifteen, twenty, or perhaps thirty years before getting financial returns. It is the same in reforestation; we know enough already to assure us that the returns will be certain, though delayed.

We need not expect to clothe the State with forests by legislative enactment. Our laws in regard to forests are apt to be illy considered, but there is one thing that ought to be done: an intelligent commission ought to be set at work gathering data and formulating a definite plan. We should then be able to work coherently and intelligently.

Again, in the northern part of the State there are many acres which have reverted to the State and are now under State control. I advocate making a preserve of this area and simply leaving it alone. Naturally the fire must be kept out of it. The cost of maintenance would not be excessive. I believe that I could find one man who could guard it. I should make it a game preserve by forbidding all hunting on it.

Education in forestry work must begin in the common schools and respect and love for trees must be implanted in infancy and grow up with the growth of the boy. Our ancestors ought to have hated trees, they were in the way; but we should blame ourselves for being so thoughtless as to despise the best thing we have because of inherited prejudices.

Much good can be done by individual example. Who cuts down one tree and replants another is just, because he leaves the world as he found it. He who plants a grove and cares for it is a benefactor of his race.

W. C. Stuart, Newaygo county: At the spot in my county where four townships meet there is a little village called Elm Corners. Forty years ago my father planted a tree to mark the exact spot. This tree blew down

and the stump rotted away. I set out another elm a few years ago after the surveyors had again located the corner accurately. Unfortunately this tree died, and I had to reset. Then came the trouble with the boys. Four times I have reset the tree; four times it has been torn down. I am ready, therefore, to preach the necessity of the education of boys in the love of trees.

C. S. Bartlett: In my locality fence-post timber is almost exhausted. What can we plant for fence posts?

Dr. Beal: Twenty-one years ago I planted one hundred and fifty kinds of forest trees at the College. Thirteen years ago I put out some locust sprouts among them; when twelve years old they were large enough for telegraph poles, and are extremely durable. These locusts should not be set singly, but mixed with other trees to get the benefit of the crowding of other trees. Naturally the trees to which I refer are not the honey locusts.

A. P. Gray: Do not wait for trees to grow, simply set them out and go on about your proper business. The trees will grow while you are at work. I have put out some groves of nut-bearing trees in Traverse county and have had a good many crops.

Dr. Beal: Locusts do better on sandy soil.

J. M. Stone: How are you going to take care of the wood lot that is now well covered with refuse timber and brush?

Dr. Beal: We do not know the best way to treat such areas. Keep out the fires and keep out the sheep. Do not try to save the large forest trees. They will die when their fellows are removed.

A. B. Cook: It seems to me that the best tree of all has not been mentioned. Twenty-three years ago my father set out a grove of sugar-maple trees on our farm. It has produced good crops of sugar now for several years and rents for five dollars an acre. Which is as much net profit as most of the other acres of the farm have produced.

Dr. Beal: Prof. Davenport of Woodland, Mich., told me that they had a sugar bush which paid them twelve per cent net profit, valuing the land at fifty dollars an acre.

THURSDAY EVENING.

Hon. William Ball of Hamburg in the chair.

PRACTICAL EDUCATION.

PRES. J. L. SNYDER, AGRICULTURAL COLLEGE.

I am here tonight to speak to you for a few minutes on Practical Education. I should much prefer to use the term "industrial education" had not the word "industrial" been given an unsavory odium by its association with reform schools and other institutions which are of no help to industrial education in the true sense of the term.

Education is a broad term, implying the improvement of mind, soul and body. It is not acquired alone from books and schools, but what we hear, what we see, what we think and feel are all so many influences storing the mind, cultivating the feelings, and fashioning the manners. Education is not only mental, but physical as well,—not only the training of the mind, but the eye, the hand, and the whole being. Many of the results are transmitted to future generations, and after centuries of effort education has made us what we are. It has been the means by which mankind has made its way out of superstition and darkness into the light of day. It used to be, and in many countries is yet, the privilege of the few, but in this land of liberty at least a good common school education it within the reach of all, and to those young men and women of patience, perseverance and pluck there is no position, educational or political, which is not within their grasp. There is very little difference in advantage in this country between the poor boy and the boy of means. The poor boy who has had ambitious parents—parents who were able to appreciate the nobler things of life—is infinitely better off than the son of the millionaire who cares for nothing he cannot have, and desires nothing except that which money will buy. These facts are demonstrated on every hand. Nearly all of the presidents of this country were sons of poor parents. The same is true of our other great statesmen. Webster was a poor country boy and Clay the "Mill Boy of the Slashes." If you will investigate the lives of the prominent men in any of our great cities today you will find that about ninety per cent of the leading professional and business men were country boys, and the majority of them knew nothing of the luxuries of life in their younger days. The people of no other country are so nearly on an equality. This is not only the best time since the creation of the world in which to live, but what is still far better, this is by far the best country under the shining sun in which to live. And in this country, with all its varied climate and soil; with its mountains of minerals and its fertile plains; with its cities of splendor and all

their advantages and attractions, there is no place where the man of limited means can live and rear his family with more comfort and safety than on a Michigan farm.

OUR EDUCATIONAL SYSTEM.

Our educational system is very largely a product of the last century, or even before that time.

Our older American colleges were nearly all the children of the church. Harvard, Yale and Princeton of the northern states, and William and Mary, Hamden-Sidney, and Washington and Lee of the south, these and a score of other institutions, were established by the church. The preachers, most of them fresh from the universities of the old world, were in the early days almost the only learned men, and therefore the only teachers. Naturally enough, as they were the founders and teachers, these earlier colleges were devoted almost exclusively to the cultivation of theology, classics, and philosophy, and were modeled after the schools of the old world.

They were for the few who expected to become preachers or follow some learned profession. They studied nothing in college that brought them in touch with the struggling masses. It was not supposed at that time that anything more than the rudiments of an education was necessary or even desirable for the man who earned his bread by the sweat of his brow.

Soon after the first colleges were opened in this country, it became apparent that preparatory schools were necessary to furnish students for these colleges, and as a consequence academies sprung up all over New England, and in many of the other eastern states. These preparatory schools adopted courses of study along classical lines so that their students could enter like classes in the colleges. About this time the elementary school came into existence in this country. It is a little interesting to note that the universities and colleges had their existence long before the common schools. Education is not a growth or evolution from the primary school upward to the university, but rather a letting down from the university to all the steps below.

But almost within the last quarter of a century the high school has sprung into being, taking the place of the old New England academy as a preparatory school and at the same time serving to the many as a finishing school.

While about nine-tenths of the pupils entering these high schools never pursue a course in a college or university, yet the courses of study are arranged to suit the needs of the few who expect to enter a college or university.

This pressure from the higher institutions has been so strong and so persistent that many of the best high schools of our State offer at least one course of study which omits from its curriculum U. S. history, civil government, political economy, physiology, and physical geography.

Think of a boy twelve years in a school established and aided by the state, in order that the state may have intelligent, patriotic citizens, neglecting the study of his own nation, and spending the time which should be given to it on Latin!

This brief sketch gives us an idea of the influences which have moulded our present system of education.

The great majority of mankind must work for a living and public school education should recognize this fact, and instead of leading young people away from the farm and other occupations to which they naturally belong, it should endeavor to make them intelligent, skilful and happy in these occupations. Instead of educating pupils away from work or in such a way as to give them a distaste for it, and lead them to believe that there is some easier way of getting a living, we should train them to work, and teach them that labor of the hands is just as honorable as labor of the head, but that a combination of the two is most likely to give the best results in the end.

There is nothing honorable or dishonorable in labor of either the hands or the head. It is the motive that prompts the labor and the spirit in which it is done that makes it either noble or ingoble.

TECHNICAL SCHOOLS.

When the great industrial awakening set in after the war technical engineering schools began to be established. There was soon a demand for their graduates and today hundreds of these schools have been opened and are turning out a class of men who can apply science to the manufacturing industries, and you all know how cheap all classes of manufactured goods are compared with prices twenty-five years ago. A carriage that would have cost $140 then can be bought now for about forty. The same is true with the mowing machine, sewing machines, and almost all other classes of goods. All these wonderful changes certainly have not been detrimental to the agricultural classes. They can now have conveniences and helps which were impossible to them a few years ago. Neither have these changes proved injurious to other industrial classes. With all these improvements come shorter hours and in most cases higher wages.

This means more of the comforts of life; more time for improving the mind and enjoying society and social life.

Now if by the aid of education, science and invention the manufacturer has been able to cut prices in two and still prosper, cannot the farmer by getting more brains and science into his work still prosper at greatly reduced prices for his products?

It is certainly not reasonable to suppose that all other industries, arts and trades could pass through such a transition stage and the great art of husbandry on which all others depend remain undisturbed. It being the most stable and the foundation of all it is affected more slowly, consequently will be longer in adjusting itself to the new conditions. But if the industry of agriculture does revive, and I know it will, it will do so by following the same general lines of operation that have given our other industries so much success. It must apply the great principles of science and trade to the practical work on the farm. It is not enough to sow and reap as our fathers have done. We are living in a different age. If our grandfathers were to come back they would not know this world.

ORIGIN OF THE AGRICULTURAL COLLEGE.

A few far-seeing men of this State nearly half a century ago anticipated the future needs of agriculture and made provisions accordingly. They saw that science and education were being applied to all other industries and they realized that the time would soon come when farmers must apply the same scientific knowledge and skill that people in other industries were using or they would fall behind in the onward march.

This feeling resulted in the establishment of your Agricultural College just forty years ago. There was no school of the kind in this country. In establishing the University and Normal School the task was simple. There were many similar schools and many precedents which they could follow, but not so with this school. It was to be entirely different from any other school. Scarcely any two of its friends could agree on just what it should be, but they were all agreed, however, that it should be for the farmer's boy and that the instruction should be practical. On account of a lack of funds they were compelled to take unimproved land and erect the buildings in the woods, and there they struggled on, meeting one difficulty after another.

THE SUPPORT OF THE COLLEGE.

After the college had been in operation about five years Senator Morrill of Vermont, then a congressman, introduced and had passed a law granting government land to states for the benefit of colleges of agriculture and mechanical arts. Under this law our college received 240,000 acres of government land. About 140,000 acres of this land has been sold. The State holds the money and pays the interest on the funds to the college. In addition to this the government passed another act by which the college was to receive $15,000, the first year after the act was passed, and to this amount $1,000 was to be added each year until the sum reached $25,000 per year. The experiment station act gives the college $15,000 each year to carry on experimental work in agriculture.

None of the funds derived from the sale of public lands or from the general government can be used in erecting or repairing buildings. The State must furnish the buildings and keep them in repair. In other words the government at Washington says to the State of Michigan, "you furnish the grounds and buildings and we will equip your farm with machinery and stock, equip your laboratories and pay the professors as well as carry on the experiments in which you are interested and furnish you with the bulletins giving the results of these experiments."

I mention the source of our income and the help given by the general government to the college because so many people are not aware of these facts and naturally suppose that the college is a great burden to the taxpayers of the State. In its early days it did receive considerable help in addition to that required for buildings, but it is believed that in the future, with the exception of $2,000 or $3,000 each year to pay for student labor, the college will need nothing from the State except that which is necessary for repairs and new buildings as they are needed. This year we receive $10,000 from the State and about $80,000 from the general

government. If we can receive $10,000 or $11,000 from the State for each of the next two years we will get along nicely. This will mean to the farmer whose farm and property are valued at $5,000 a little over four cents each year.

THE PURPOSE OF THE COLLEGE.

The college was founded for a distinct purpose—namely, to improve and elevate the farmers of the State, and to bring to all agricultural interests such help and training as scientific investigation can offer. But the provisions of the Morrill act not only provided for instruction in agriculture and its allied sciences, but it as well provided for instruction in mechanic arts. We then have for boys two courses of study, the agricultural and the mechanical. It is well to remember that it is a technical school. The instruction is practical and specially designed to fit students for a life of service, and not a life of leisure. The agricultural course has but one object in view, and that is to prepare the boy for his future work as a farmer. At the same time it recognizes the fact that the farmer should first of all be a man in every sense of the term. In this country he should not be a mere machine trained only to do certain tasks at a certain time, and in a certain way. The farmer, compelled to baffle with so many conditions of soil, climate, disease, and destruction, should of all men be able to think clearly and express his thoughts forcibly. He must be able to bring to his work not only willing hands, but as well, all the help that a thorough training in the natural sciences can offer. There is no other calling or profession which so largely depends on nature's laws as revealed in chemistry, soil physics, botany, entomology and a dozen other sciences, as that of the farmer. He should of all men have a thorough knowledge of these subjects, and such our college endeavors to give him. This knowledge is not only theoretical, but it is illustrated in a practical way, both in the laboratories and by two and one-half hours of labor on the farm each day.

While this study in science is carried on in a practical way with practical ends in view, it has none the less value as a disciplinary exercise.

The careful analysis and classification necessary to do successful work in the natural sciences gives mental discipline which is admitted by most educators to be at least equal to that given by a study of the dead languages, while at the same time they give practical knowledge which will rob labor of its drudgery.

SCIENCE AND ITS APPLICATION.

Throughout the whole course, science and its application go hand in hand. As the course is now arranged if a student remains but one term he will take back to the farm with him something of practical value, and if he remains for the whole course he will not only have a thorough and practical knowledge of the science and art of husbandry, but at the same time he will have a well trained mind equal to that given by any other good four year course of study. In addition to this he will by daily labor develop his body and make it ready for a life of service. The mechanical course is organized and operated on the same principle as the

agricultural course. More time is given to mathematics, drawing and drafting and less time to science, and work in the shops takes the place of labor on the farm.

The object is not to teach a boy the trade of machinist, carpenter or plumber. It seeks to teach him the underlying principles of all these trades; to give him a thorough education along mechanical lines so that he can, for instance, go into a large factory and measure the amount of power the boilers are producing as compared with the coal consumed. If there is waste of power, to detect the place and suggest a remedy. Last year our students tested the power of several large mills. In one case the waste of power was so great that the plant was reconstructed on a different plan. At the same time these students by their daily work in the shops become fine mechanics and usually find ready employment at good wages when they leave college.

But there are many young farmers in the State who cannot afford either the time or the money to take a four years' course, however cheap it may be, yet who are anxious for more knowledge along their special lines of work. To help this class of energetic young men we have arranged our special courses of six weeks in length. They begin right after the holidays and consist of a course in each of the following: Dairy husbandry, live stock husbandry, fruit culture. Floriculture and winter vegetable gardening. These courses are now in progress and the 50 students taking this work are enthusiastic and are certainly gaining much useful knowledge which they will put into practice on their return home.

We do not pretend to give much of the science of these subjects in these special courses. The work is made very practical. The teacher follows his lecture by practical demonstrations, in which all the students take part. They do practical work under the direction of the teacher in the dairy and stables, or in the garden, orchard, greenhouse or forcing houses.

Any one over fifteen years of age can enter these special courses on the payment of a nominal fee of $2.50. No examination as to scholarship is required.

A COURSE FOR WOMEN.

In addition to these special courses there has been added to the college this year a four year's course of study for women. If it is necessary to educate men so that they can raise cattle, sheep and swine according to scientific principles, how much more important it is to educate the women of this land who are to rear the next generation of people. If only one of the two members of the head of the family can be educated let it be the mother. It is usually from her that the child receives the impressions which most influence his character and after life.

What science has done to relieve men of toil and drudgery it can do for women. There is no place in the world where science can be used to better advantage than in the kitchen. The course for women is much the same as that offered by other good colleges, except that instead of the dead languages it gives a thorough and practical training in domestic science and household economy.

It gives an extensive course in literature, mathematics, the natural sciences, French and German, drawing and the history of art. It also offers a variety of elective studies, such as music, painting, floriculture, fruit culture, dairying, poultry raising and millinery. But the distinguishing features of the course is the emphasis it lays on homemaking. The cooking kitchen is now one of the attractive features of the institution. After a thorough training in cooking, sewing, cutting and fitting, comes a course of lectures on the home. This department was opened at the beginning of the year and now nearly fifty bright young women are enthusiastically taking the work.

Abbot Hall, a beautiful dormitory, is given up to these young women who are under the care of a careful matron.

The college is certainly carrying out the design of the founders in offering to the young people of Michigan an opportunity to acquire a thoroughly practical education at a very small cost.

If the farmers of this State can realize that education to the boy who expects to live on the farm means as much to him as education does to the boy who enters a profession, we shall soon have an educated class of farmers who will rank in scholarship and culture and in every other way with the members of the learned professions. The place to begin this education is in our public schools and instead of following the courses of study planned to meet the conditions of a century ago, we should give more attention to practical education, and prepare students for taking up the work which they will follow after leaving school. The farmer boy who expects to live on a farm, should in the public school study such branches as would stimulate him in this direction and give him such practical knowledge as will aid him in his future work. The village boy or city boy who expects to enter some mechanical line of work, should in his school training have a course in mechanical drawing and shop work, and all girls should certainly before leaving the high school, or better still before they enter it, have a thorough course in domestic economy. Our public school education is the foundation of our social system, and there is no way in which the industrial classes can be so benefited as by reorganizing our educational system along the lines of practical education.

Mrs. H. H. Hinds of Stanton: I have been much interested in the last paper; I hope it will aid in inspiring boys to stay on the farm and will imbue them with the true American ideas and feeling. The crowning emotion of the American is love for country. Mothers should teach their boys to love the flag. They should give them its history and show them how it has been sanctified by the blood of their ancestors.

FRIDAY MORNING.

Dr. W. J. Beal in the chair.

QUESTION BOX.

Q. Why does R. M. Kellogg grow strawberries in hills rather than in matted rows?

A. M. Welch: Because of better cultivation, the whole surface being cultivated shallow, which is impossible in the matted row. Thereby he gets finer and bigger berries.

Q. What is the best method of destroying the Canada thistle, and have we any effective State law governing the matter?

Dr. Beal: State laws against Canada thistles are inoperative unless the people stand behind them. Even near Lansing the overseers of the highways do not oversee, but rather overlook. The best method of killing thistles in small patches is by the use of salt, perhaps. Put on very thick.

Mr. Davis: I have killed three patches by thorough salting and turning on the sheep.

I. N. Cowdrey: I have done the same, and have also found that thorough cultivation is very effective.

Q. What has been the greatest weight of lambs at four months?

A. B. Cook: Our lambs weighed seventy pounds at four months, although I had one, a Lincoln, which weighed one hundred and four at that age.

Mr. Davis: My lambs, which were a mixed lot, weighed seventy-six pounds at four months.

Q. Is the turkey a destructive fowl, or is it not the best insect destroyer we have?

Col. Saviers: The turkeys do no harm on the farm, and they are good grasshopper catchers; for this purpose the young fowls are better than the old ones.

Q. Shall we spray fruit trees when in bloom?

R. Morrill: No; it doesn't do any good; it destroys the bees, and besides it is unlawful.

Q. What is the best arrangement for keeping cows clean in the stable?

Prof. Smith: I have recommended either the Bidwell stall or a device called, for the lack of a better name, the "Hoard stall."

William Taylor: We are using twenty-five Bidwell stalls, and when properly bedded they keep the cows very clean.

A. K. Porter: I have a drop behind my cows and tie them with a rope.

J. H. Brown: We are using five Bidwell stalls and like them very much; they keep the sides and udder perfectly clean.

Q. What is the reason that heifers of the same breed and condition do not bring as good price as steers?

Wm. Ball: That phenomenon has not been satisfactorily explained. Some butchers have claimed that they do not cut up as well, but experiments in Iowa go to prove the contrary.

H. H. Hinds: This discrimination against heifers is purely arbitrary and unjust. The thanks of the cattle breeders are due the *Breeder's Gazette* of Chicago for aiding in wiping out this discrimination. Butchers are now finding out that heifers are equally as valuable as steers.

A. B. Cook: The discrimination arose originally from the danger of the heifer being in calf. This is now avoided by the sale of spayed heifers.

Q. Is there any difference in the quality of skim milk from the Jersey or Shorthorn when fed to pigs?

A. There is practically no difference.

Q. What difference is there between Oxford, Hampshire and Shropshiredown sheep? Which is the best breed of hogs, improved Berkshire, Poland China, or Duroc-Jersey?

H. H. Hinds: The down breeds in sheep all originate from a cross with the Southdown. The Oxford and Hampshire are larger than the Shropshire, which is the most numerous and seems to nick better with our common sheep than the other breeds do.

The Poland China is a purely Yankee product and is more numerous than other breeds. Take the country as a whole, ten hogs out of every eleven are Poland China.

Q. What will prevent pear-tree blight?

J. N. Stearns: To cut it up and burn is the only remedy. The disease is due to bacteria.

Q. Is there any difference in value between the roan and the red Shorthorn?

Wm. Ball: Yes, some people seem to think so. A roan is equal to a red in every particular as far as beef production is concerned. There is absolutely no difference in the value between the two. Still we must raise red Shorthorns because some people want them that color. We get roan calves from red parents and red calves from roan ones, hence the color is no sign of pure blood. The preference for the red color is a fad only.

SMUTS AND RUSTS OF GRAIN.

PROF. C. F. WHEELER, AGRICULTURAL COLLEGE.

Among the losses which Michigan farmers meet with each year, one is due to the damage of our grain crops caused by the fungous diseases known as smuts and rusts.

To the ordinary observer the black, dusty masses which fill the kernels of wheat in stinking smut or bunt, and replace the heads of oats, barley and wheat in loose smut, and cause the distorted, swollen black masses on the cornstalk, do not seem like definitely organized plants. Yet, as a matter of fact, the black dust is composed of thousands of germs of minute plants. These germs, called spores, have the same uses as seeds in the higher plants. They are blown about by the wind and lodge on the healthy kernels of the grain. When the grain is sown and the kernels sprout, the black spores sticking to them also germinate and send slender threads into the young plants.

In the case of smuts (not in rusts) the slender threads, too fine to be seen with the naked eye, follow the growth of the grain plants during the season, and their presence is not known till the heads begin to develop. The flower or grain is then filled by a mass of the fine threads just mentioned, which takes up the nourishment intended for the grain and forms a mass of new spores ready to be blown about and to infect the next year's crop.

The ravages of smuts and rusts have been widespread and are noticed in the writings of Hebrews, Greeks and Romans as the causes of famines. It is only during the last hundred years that these parasitic plants have been carefully studied and remedies discovered by which the great damage caused by their attacks may be prevented. During the last twenty years much has been learned of their life histories by the careful experiments of botanists at home and abroad.

LACK OF INFORMATION ON THE SUBJECT.

It will be well to quote from the third volume of the Transactions of the New York State Agricultural Society for the year 1843 the following statement to show the want of correct knowledge of smuts at that time.

"There is no part of agriculture which is yet enveloped in so much uncertainty—none in which there has been more controversy and a greater number of conflicting opinions and theories by men who profess to be practical, closely-observing farmers. * * * Opinion goes before, and facts are afterwards hunted up to support it. Men are always given, as Locke says, to see but little, presume a great deal, and jump to the conclusion. Listen to the number of different opinions given in 1843 as to the causes of smuts. Some suppose that it arises from injuries or bruises of the young grain. Others, that it proceeds from a want of due impregnation; others, again, have contended that it is caused by

an ulcer in the blossom or by a morbid swelling of the ear; and several distinguished observers declare that it is the work or effect of insects."

During the last fifty years many experiments have been made both by scientific men and practical farmers, and today we know the facts in the life history of those smuts which affect our grains.

LOOSE SMUT OF OATS.

The loose smut of oats ripens when the grain is in flower and the black spores are blown about by the winds. This smut has probably the widest distribution of any of the thousands of species of this group of fungi already known. It is known on every continent and occurs all over the United States. In fact it is an uncommon thing to find a field of oats free from it, and the amount of damage it causes is very great; not one in a thousand of those engaged in growing oats has an adequate idea of the extent of its ravages.

From the best sources available it is believed that Michigan farmers suffer an average annual loss of eight per cent of the oat crop.

Prof. Kellerman and Mr. Swingle put the loss from oat smut alone in Kansas in 1888 at $1,382,328, in 1889 at $850,554, in 1890 at $911,299.

Dr. J. C. Arthur estimates the damage in Indiana in 1889 at $797,526, in 1890 at $605,352.

The value of the crop in Michigan in 1896 being $5,715,059—near enough to call it six million dollars, it is plain that Michigan farmers lost nearly $480,000, every dollar of which might have been saved if all the oats used for seed had been properly treated.

PREVENTION OF SMUTS.

To combat fungous diseases successfully, the greater part of our work should be done in trying to prevent the disease rather than in trying to cure it after it has got a start. As smut spores grow best in water and can only grow where there is sufficient moisture, it is evident that thorough drainage and good tillage are among the important means of prevention.

In the next place, it is now well known that many kinds of smut spores will only grow in the presence of fresh manure, therefore put your fresh manure on meadows and root crops the year before you prepare the ground for grain crops.

A proper rotation of crops will be another good preventive measure.

Liver of sulphur has lately been used in the treatment of seeds with good results. This method of treatment has the advantage of being simpler and easier that the hot-water treatment. Dissolve one and one-half pounds of liver of sulphur in twenty-five gallons of water in a wooden vessel of some sort, a tight barrel will do. Treat three bushels at a time. Leave the oats in the solution for twenty-four hours. Stir several times during the day. Then spread out the oats to dry. Only use the same solution three times.

LOOSE SMUT OF WHEAT.

This disease of wheat occurs in Europe, North America, North Africa, Central Asia and the East Indies. It occurs in many parts of the United States, though, fortunately, it is rare or entirely absent in many localities. It often causes a loss of ten per cent of the crop and has been reported as destroying over fifty per cent of a crop in Michigan. The loose smut is to be feared not so much from the great damage it causes, but because it is difficult to prevent, and if once introduced into a field it is likely to remain year after year. No effective treatment is known.

TREATMENT.

The Egyptian peasants found out in some way that if they built a fire of straw and threw handfuls of their sorghum seed through the blaze it would prevent the attacks of smut by killing a large share of the spores adhering to the grains. This is the earliest treatment of which I have any knowledge. A little over a hundred years ago old Jethro Tull recommended brining and afterwards rolling the seed in powdered lime before sowing.

One hundred and ten years ago Arthur Young made very careful experiments in treating seed wheat (after he had rolled it in smut), after washing well in; first, clean water; second, lime water; third, lye of wood ashes; and fourth, a mixture of arsenic and salt. The results are so interesting that I will give them. In the small plot sown with seed washed in clear water he found 325 smutty heads. In the plot treated with lime water, 43 heads. In the plot treated with lye of wood ashes, 31 heads. In the plot treated with arsenic and salt mixture, 28 heads; and in a check plot sown with seed rolled in smut there were 377 smutty heads.

A French botanist, M. Prevost, was the first to introduce the copper sulphate treatment, he having noticed that a peasant near Montauban did not have any smut in his fields after brining his wheat in a copper kettle covered with verdigris. At present the blue vitriol (sulphate of copper) treatment is one of the standard remedies. Dissolve one pound blue vitriol in twenty-four gallons of water. Soak the seed twelve hours and then put the seed in lime water for ten minutes, made by putting one pound of quicklime in ten quarts of water (soft water).

CORN SMUT.

This fungous disease, which attacks Indian corn, is so common that a discription of its external appearance is unnecessary.

It has been known since the discovery of the country and has followed the cultivation of maize into all parts of the globe.

Like the other smuts, the one under consideration is as much of a plant as corn itself and belongs to the great group of fungi, starting from a minute round body called a smut spore, the equivalent of a seed among higher plants. Instead of drawing its food from the ground, it has

learned that it is cheaper to rob the corn plant of its rich juices, and actually lives in the corn plant, producing the well known pustules or smut boils, which when ripe are filled with a multitude of black spores to infect future corn fields. The wind scatters them here and there and everywhere. They are packed into silos, eaten by cattle, and protected by their thick walls will retain their vitality under favorable circumstances for at least eight years.

METHOD OF INFECTION.

The original smut spores do not infect the corn directly, but these must first grow in wet places where there is fresh manure. They will not readily germinate in pure water.

A single spore, growing, will give rise to a multitude of smaller secondary spores, which are produced both in the air and under the surface of the water. These may be carried by winds everywhere. Only those spores grow which fall upon growing corn plants.

The corn plant may be infected from the time it comes out of the ground till it tassels out and the ears begin to form. The disease is produced entirely by the secondary spores which, carried by the wind, fall on the leaves and are washed into the sheaths, starting to grow into the interior of stalks, tassels and ears, and fourteen days from the time of infection the smut boils begin to appear. Each mass of pustules is the result of a separate infection.

DAMAGE CAUSED BY CORN SMUT.

It is difficult to estimate the amount of damage caused by this smut because the plants are seldom injured in the same degree.

The results of some experiments carried on in Kansas go to show an average loss of six per cent.

Experiments are in progress at the Agricultural College, and some results have been reached. The experiments will be carried on for some years to come.

Two years ago the percentage of loss in the corn fields on the college farm was estimated by counting 18,739 stalks in two fields. The number of smutted stalks was 4,009. On the 18,739 stalks were found 767 smutted ears—about four-tenths of one per cent.

DISCUSSION.

Q. Must oats be treated every year to prevent smut?

Prof. Wheeler: It is wise to treat the seed oats each year, because the spores will live for a good many years, and because the smut will be carried from farm to farm in the threshing machine. Very smutty oats well treated are equally as good for seed as good oats. The treating seems to increase the rate of germination.

Q. Will not the variety of corn make a difference as to the quantity of smut?

Prof. Wheeler: It may make a difference; we have no experiments on the point.

THE ESSENTIALS OF PROFITABLE APPLE GROWING IN MICHIGAN.

J. N. STEARNS, KALAMAZOO.

The essentials of profitable apple growing may be enumerated under these heads: Location, good trees, sorts, planting, cultivation, fertilization, pruning, spraying, and marketing.

LOCATION.

A plat of ground, somewhat elevated above the surrounding land; such land is easily drained, which is quite important, and it is also more exempt from frosts. The ground should be well fitted, by subsoiling if there is a clay or tenacious subsoil, and the soil should be sufficiently fertile to produce a good crop of corn or potatoes.

GOOD TREES.

These should be thrifty young trees. Do not by any means be induced to plant heavy old trees, as they are about sure to be so checked in the growth the first year of planting as never to recover and make good healthy trees.

SORTS.

By all means plant good sorts; I believe the time is past for planting fruit trees of any kind with special view of quantity. Within the past few years I have had a bitter experience in this direction. I bought 8 to 10 car loads of very fine apples, consisting mainly of Jonathan, Northern Spy, Fameuse, King, Red Canada, Ben Davis, Cooper's Market, Flushing, Spitzenberg, and Golden Russet. While I was able to make good money on the first five varieties, I more than lost it all on the last four. My observation and experience each year more than confirm me in this view: When fruit is scarce, the Ben Davis is better than none, and but little better either. Bear in mind, a red apple of good quality is always in good demand.

PLANTING.

When ready to set the trees, see that every root is cut off with a sharp knife, cutting from the under side; this smooth cut causes the root to callous over soon, when young feeding roots will immediately push out. Be sure and cut back to where the root is fresh. While I am not quite ready to adopt Prof. Slingerland's theory of cutting the roots of a tree about all off, I do not consider long roots of as much importance as I

formerly did. In planting, I consider it of importance to the life and vigor of the tree, that when the soil is about two-thirds filled in, it be firmly tramped, then the balance of soil filled in and left loose; this forms a mulch to prevent the evaporation of moisture.

CULTIVATION.

This should commence as soon after planting as possible if you wish to insure the growth and health of the tree. Use some fine toothed harrow to just stir the surface, the oftener the better, especially the first year after setting. In fact, I consider it just as important to keep up the cultivation of an apple as a peach orchard, to obtain best results. I believe there is no reason why we should not get an apple crop as regularly as we do a peach and pear crop, if the requirements of the orchard are attended to. In the peach we expect to get a crop every year unless the mercury drops too low during the winter, which seldom affects the apple.

FERTILIZATION.

When the State was new, in clearing, nearly all the timber was burned on the ground, furnishing abundance of potash, and there was plenty of humus in the soil to conserve moisture. So a tree stuck in the ground in most any shape grew vigorously; but we of today find the situation different. The cropping of the soil has largely impoverished it in these essentials to the proper growth and fruit producing ingredients. We find the soil becomes dry and hard much sooner than when new, so we must study what its needs are, and by artificial application put it in its original shape as nearly as possible. This I would do by applying ashes and barn yard manure. Muck from the swamps is an excellent fertilizer composted with manure. I find it very valuable in holding the moisture.

PRUNING.

We are finding year by year that this feature of successful fruit growing is of much more importance that we formerly supposed. While I have been engaged in this business over thirty years, I have learned some valuable lessons along this line within the last four years. In the first place, when the tree is first set, the top should be cut back, at least two-thirds. With the peach, we trim up to a whip, and I am half inclined to think it would be best for all fruits, with the possible exception of the cherry. There is not a season that I do not see from one-half to three-fourths of the trees planted, ruined for the lack of attending to this at time of planting. This does not apply to people making a business of fruit growing, but to people through the country, planting for their own use. Not one man in fifty would accept a tree at any price, if it was pruned as it should be when delivered to him. The top should be shaped the first and second year after planting, only leaving such branches as are wanted permanently for the top, so as never to have to

cut off large branches next to the body of the tree, as this is apt to leave frequently a bad spot, which will decay, and cause loaded branches to break down, from weakness caused by this untimely pruning. It is important to do a large amount of heading back on trees, especially after coming into bearing. This is beneficial in several ways. It causes new growth for healthy fruit buds, and concentrates the vitality of the tree to a less number of blossoms, thereby giving vitality to the pollen, so that it is able to produce perfect fruit. I have been experimenting along this line with peach, pear and apple, and I find we nearly double the size of the fruit, as well as cause trees nearly barren to produce abundantly.

SPRAYING.

This has become an indispensable adjunct to fruit growing. In fact, there is no fruit we grow, even to the strawberry, but is benefited by spraying. But it has taken years for us to learn to do this work aright. I so often hear the remark made, "I sprayed my trees, but it did no good." In every case that I have carefully inquired into, I found they had delayed doing it in the proper time, or had not been thorough. We do not realize the necessity of reaching every particle of the tree, in fighting the fungous diseases, and this is best done on all fruits, just before blossoming, or just as the buds begin to swell. Of course it should be followed up after fruit sets. In fact I always use the Bordeaux mixture as a solution in which to apply arsenites for the codlin moth. This should never be applied while the tree is in blossom, but soon after it falls, while the apple and pear stands straight up and calyx is open, so the solution may abundantly lodge there. This should be repeated as often as danger of being washed out by very heavy rains.

MARKETING.

If there is one feature of more importance than another, in making apple growing profitable, it is marketing; for if you succeed in every other point and fail in this, there will be no more permanent profit. I sometimes think it would be a benefit to us in Michigan, for a few years at least, if we had to ship every pound of fruit we raised over 2,000 miles, as they do in California. We should soon learn what they learned years ago, that it would not pay to put any but good fruit on the market, and that in the most attractive form. I am satisfied, notwithstanding the immense crop of apples raised the past season, that if this plan had been strictly adhered to, the crop would have brought very much more money to the growers of the State. But, on the plan it has been marketed, it will take years, even if we attempt to correct it, to overcome the injury to our reputation. Why, there have been car load after car load rejected when they arrived and were inspected by the party ordering them, and they had to be sold at any price offered, which was usually at a great loss to the shipper.

Now, I, with many others, have been advocating the importance of this for over twenty-five years, but it seems uphill business to convince the masses of the value to the State, so I will give you in a few words

how I conduct the marketing part of the business. Soon after engaging in fruit growing as a business, I became convinced that reputation, in this calling especially, was all important. I have endeavored to so grade and pack my fruit that the purchaser would be pleased with it for the price paid. In this way I have built up a trade from Maine to Minnesota, and it has been growing from year to year. Some of my customers I have regularly supplied for fifteen years. Although growing quite a quantity of fruit, from the strawberry to the pear, in the past season of low prices I was obliged to put but very little of first-class fruit on the general overstocked market. My card or stamp is placed on every package of first-class fruit, and there are plenty of consumers always willing to pay a fair price for a good article. A commission man in New York city, who had been in the business for twenty-five years, wrote me that the supply of carefully selected fruit was not over twenty-five per cent of the whole, while the demand was fully seventy-five per cent for that class of fruit, and he said therein was where the profit lay to the grower. I believe any grower of fruit may attain this profit who will stick strictly to this principle, and the grower who cannot, or will not, should pursue some other calling.

DISCUSSION.

A. P. Gray, Grand Traverse county: One of the things of chief importance is the question of latitude. In the northern part of the State we pay more attention to location than is necessary in the southern part of the State. We have to look carefully at the soil and air drainage when we choose a place for our orchard. We need to select our varieties carefully also and get the hardier kinds. We must pay particular attention to cultivation on account of the lack of rainfall, and all our work must be done carefully. In Georgia Mr. Hale sets his trees by pressing each into a spade hole. My trees are set by a man on his knees. In the tropics elevation is sought for climatic reasons to get a cooler zone. Here we want an elevation so steep that the water runs rapidly; absolute height is not the question, but relative height is necessary for air drainage. Round topped hills are the ideal places for orchards, because of the perfect air drainage. Plateaus of equal height are not well suited.

In the matter of marketing we cannot be too careful. Last year I put a card in each barrel guaranteeing the fruit. Now the fashion is to put a few even sized, high colored apples on the top and bottom. Everybody expects the best on top, and no one is deceived thereby. I cater to this expectation, but I guarantee the fruit to be No. 1 from top to bottom. In the selection of varieties I lay great stress on color. Red apples sell best and a novice would not go far wrong if he selected by color alone. Bright red apples will outsell yellow varieties of far better flavor and quality. Peaches and pears must be yellow. Lately blue plums seems to be the thing. Last year blue plums sold for a dollar a case, while others brought fifty cents. Sweet cherries must be dark, light colored ones will not go.

R. Morrill: We cannot grade our fruit too carefully. There is nothing so harmful as deception in the sale of fruit.

FRIDAY AFTERNOON.

E. A. Croman, of Grass Lake, in the chair.

QUESTION BOX.

Q. Where can we get twenty cents for butter?

E. A. Croman: Certainly not by selling to the grocers. Make butter of uniform excellence, and uniform in quantity throughout the year. Send either to a private customer or sell regularly to one commission man until you have won the trade.

Q. Can improved grapes be grafted on the native grape?

R. L. Taylor: They can. Cut the stock off below the ground; clear away the soil so that the scion will be covered when the earth is replaced; let the bud be about even with the surface; proceed as in top grafting; don't use wax; use clay instead; cover with soil, leaving the top bud only above the surface. All this should be done just as soon as the soil will work after the frost and before the sap starts. We can use any good strong variety of stock.

R. Morrill: Why should we graft in this way when grapes are so cheap?

R. L. Taylor: There is much advantage. If you have a vineyard which is not satisfactory you can graft it in the way I propose, and the next year obtain almost a full crop, instead of waiting two years. By putting the scion of a weak growth on a strong root you can get a better growth than on its own root.

Q. How do you plant and raise asparagus?

I. N. Cowdrey: Get year old plants from seed. Set them in a row eighteen inches apart. Enrich with manure and salt.

Mr. Brundage: I like the double row better. I find ashes to be very good for asparagus and find it a good plan to cover with white sand.

Q. Which is the better, silage or steam feed, and which is the cheaper?

Prof. Smith: Silage.

Q. Which pays best for fattening, corn in the ear or ground feed?

H. H. Hinds: Corn in the ear by all means. The cheapest of all is feeding corn in the shock without husking. My plan is to feed in the morning shock corn to the steers. Then I turn in the colts, and after them the hogs. Later in the day I follow with eared corn for the steers, which are followed by hogs.

C. S. Bartlett: Do you feed corn in the ear to dairy cows?

H. H. Hinds: I would grind the corn for dairy cows, but for young stock and fattening stock I should expect no improvement by grinding, especially where hogs follow.

C. E. Vandeventer: I have had a cow die from eating whole corn?

H. H. Hinds: Corn must be fed judiciously. What we are after in dairy feeding is to get the cow to eat all she will, and keep her healthy. Our profit comes from the amount fed over the ration of maintenance.

Q. Are the Lincoln sheep better than the Shropshires?

A. B. Cook: In my estimation, yes; they are better mutton breeds than the Shropshires. They are bigger at three months old and so they are at eighteen months. They grow faster but do not mature as quickly as the Shrops.

Mr. Davis: I want to say that my lambs weighed seventy-seven pounds at four months, and not seventy as I said this morning.

Q. Is the Rural New Yorker No. 2 potato a good potato for the farmer? Is it early or late?

I. N. Cowdrey: It is a good grower, smooth, and bothered less by the bugs than other varieties; but the buyers refuse to buy a round potato and hence refuse the Rural New Yorker No. 2. This is a new idea of the buyers, but the long potatoes now sell better. The Carmen No. 3 is better, being smoother and of better quality.

C. S. Bartlett: People always regard the Rural New Yorker No. 2 as good for nothing but to sell.

R. Morrill: I think the Rural New Yorker a good potato; I have sold 5,000 bushels at 20 cents a bushel.

J. Allen: I have raised this potato for several years and like it both to eat and sell. I have tried the Freeman by its side and do not like it as well.

Q. If but 5 per cent of the plant elements come from the soil, why does not land improve by constant cropping?

R. Morrill: The ash elements come from the soil and are removed by all crops. They are not returned in the 95 per cent which comes from the air. Constant cropping carries these elements off and thus depletes fertility.

Q. What will prevent blight on potatoes?

Prof. Wheeler: Spraying with Bordeaux mixture in the season. Commence as soon as the potatoes are up and use this mixture with Paris green in keeping off the bugs.

Q. Mr. Brown, will you describe your hog shelter?

J. H. Brown: The shelter shown in the illustration is of a "chicken-coop" shape. It makes one of the best portable shelters for hogs I ever saw, and takes the least number of square feet of lumber for its construction.

As the cut shows, the roof and sides are made by using eight 16-foot boards, 1x12 inches, each board cut into two pieces. The roof boards are each eight feet long, dressed on the upper side, and creased on each upper edge, as shown in Fig. 2. These creases are cut three-eighths of an inch deep by one-half inch wide, and make the roof practically water tight. With battens laid over the cracks no better roof can be made for such a shelter.

We make the floor separate from the shelter, so that when the floor gives out it may be easily repaired. We should have a floor by all means. In a wet time it makes a dry place for the sow and her pigs. No water that runs under the shelter can wet the floor or bedding.

The floor is made of 1x12 boards eight feet long; 2x4 or 2x6 inch stuff may be used for floor stringers, either six or eight feet long. The cut shows the floor to be 8x8 feet.

The roof-sides and ends may be built in sections, or solid. Three 2x4's, eight feet long, are used in making and nailing up each roof-side section. This shelter may be nailed or bolted to the floor. Nails need not be driven "home," and thus may be readily pulled when needed.

The front end is boarded up as shown, with a swing door in the center. The ridge is high enough for an ordinary farmer (like the speaker, for instance) to stand "upright" inside when removing and replenishing the bedding.

It will be impossible for the sow to get close enough to the "eaves" to lie down on her pigs if they happen to be back of her when she assumes a recumbent position. A railing should be fastened about six inches above the floor, the same distance away from, and across each end.

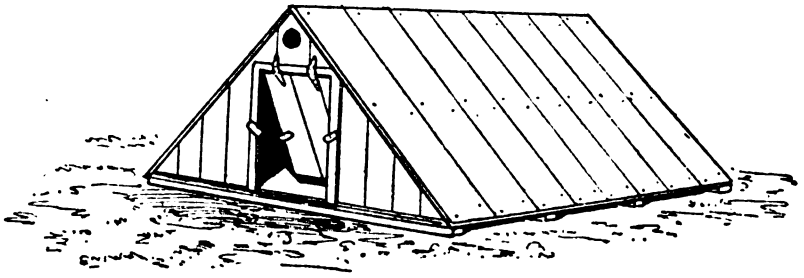


FIG. 1.

FIG. 2.

A small window or a single pane of glass can be placed in the back gable end for light. This with the door in the front end will furnish all necessary light and ventilation.

The swing door may be rendered automatic by use of two buttons. The buttons should be tight fitting, made of hard wood, of good size and fastened with bolts. When the buttons on the door casing are turned horizontally the sow, if outside, can enter but cannot get out. If she is inside, and we wish to let her out, and fasten her out, the buttons on the door are turned and the sow turns herself "outdoors." When all the buttons are left vertical, the sow can enter and depart as she pleases.

This makes a good, sensible shelter, and takes the place of a hog house very largely, in our estimation. This shelter can be built for five dollars or less, according to quality of material used. Any farmer can build one of these shelters in a half day's time.

REPORTS OF COMMITTEES.

COMMITTEE ON EXHIBITS.

To the officers and members of the Michigan State "Round-up" Farmers' Institute:

Your committee on exhibits beg leave to report as follows:

In the educational exhibit we find from the Agricultural College a very large and comprehensive exhibit of grasses, clovers, and other forage crops; also a large show of noxious weeds, all splendidly mounted. Also well executed charts of the various fungi of rots, rusts, anthracnose, etc., affecting Michigan fruits, vegetables and grains, and some valuable photographic object lessons in forestry. We also find four cases of mounted insects injurious to vegetation.

In the dairy department we find from the Agricultural College a full exhibit of dairy tools and appliances, including separator, deep setting cans, barrel churn, butter worker, hair seive, Babcock tester, butter packages, etc.; also twenty-six varieties of wheat.

In looking over the Agricultural College exhibits your committee feel it their duty to speak somewhat in detail regarding it and the educational features which it presents, namely, views showing the different methods of planting roadsides; eight views of Graceland cemetery of North Chicago; a model rural cemetery; fourteen views illustrating the various conditions of Michigan forests; fifteen views illustrating agriculture in Singapore in Southern Asia; four large cases from the entomological department at the College showing a large collection of the beneficial and injurious insects; two large charts, illustrating the edible and poisonous mushrooms; nine hand made charts illustrating parasitic fungi; several charts illustrating forest destruction; four charts, illustrating food and diet, as used in the ladies' department at the College; one large illustration of wild corn lately discovered growing in the mountains of Mexico; two hundred samples of weeds, grasses, clovers and other economic plants, all mounted and finely displayed upon the walls of the room, showing an immense amount of skill and time in their preparation on the part of Prof. Beal.

In the competition exhibit we have made the following awards:

Best one-half bushel oats, R. Brown, Ithaca, Mich.

Best one-half bushel wheat, Sam Barnes, St. Louis.

Best display corn, E. M. Wagner.

Best pop corn, Harry Hawley.

Best beans, Roy McCrimmon.

Best peas, F. M. Frear.

Best Potatoes, "White Star," E. Curtis.

Best display apples, Mr. A. P. Gray, Grand Traverse, 22 varieties.

We also found very good specimens of wheat in head, wool in fleece, mangel wurtzels, carrots, sugar beets, etc. All of which we respectfully submit.

R. MORRILL,
WILLIAM BALL,
Committee.

COMMITTEE ON CREDENTIALS.

The Committee on Credentials report thirty-four different farmers' organizations represented by delegates at the "Round-up." Of this list these are represented:

Agricultural Society	1
Farmers' Clubs	9
Farmers' Institute Societies	11
Granges	13
Total	34

The list follows:

Sumner and Seville Farmers' Club—E. Sadler, Elwell.
Lenawee County Grange—Mr. and Mrs. J. M. Abbott.
Emerson Farmers' Club—Wm. Ching, J. E. Long, C. A. Vandeventer.
Liberty Grange, No. 391—E. Franklin, North Star.
Kalkaska County Farmers' Institute Society—A. E. Palmer, Kalkaska.
Monitor Grange, No. 553—C. A. Scholtz, Wheeler.
Battle Creek Grange, No. 66—J. H. Brown, Climax.
Parma Grange, No. 710—M. G. Bornor, Parma.
Newaygo County Farmers' Institute Society—W. C. Stuart, Fremont.
Isabella County Farmers' Institute Society—A. C. Rowlander.
Pontiac Grange, No. 283—C. S. Bartlett, Pontiac.
Oakland County Farmers' Institute Society—Mrs. Carrie Bartlett, Pontiac.
Pine River Farmers' Club—G. W. Abbott.
Bethany Grange, No. 508—Thomas Richards.
County Line Farmers' Club—T. A. Bush, S. B. Brundage.
Manistee County Farmers' Institute Society—J. H. Read, Pomona.
Livingston County Farmers' Institute Society—J. B. Tazziman, Oak Grove.
Jackson County Farmers' Institute Society—E. A. Croman, Grass Lake.
Fulton Center Farmers' Club—G. M. Long, Pompeii.
Eaton County Agricultural Society—J. H. Brown, Charlotte.
St. Clair County Farmers' Institute Society—Chas. S. King.
Elsie Grange, No. 202—M. L. Tillotson, Elsie.
Coe, Chipeway and Lincoln Farmers' Clubs—C. W. Hudson.
Bangor and Arlington Farmers' Club—C. B. Charles, Bangor.
Shiawassee County Farmers' Institute Society—C. B. Cook, Owosso.
Maple River Farmers' Club—A. B. Cook, Owosso.
Montcalm County Farmers' Institute Society—Mr. H. H. Hinds, Mrs. Mary Sherwood Hinds, Stanton.
Arcada Grange, No. 500—Thomas Grover.
Ionia County Farmers' Institute Society and North Plains Farmers' Club—A. M. Welch, Ionia.
Fremont Grange, No. 494—W. C. Stuart, Fremont.
M. A. C. Grange—G. H. True, Agricultural College.
Capital Grange—Dr. W. J. Beal, Agricultural College.
Tallmadge Grange—C. C. Lillie, Coopersville.

CHARLES B. COOK, Owosso,
I. N. COWDREY, Ithaca,
J. H. READ, Pomona,
Committee.

COMMITTEE ON RESOLUTIONS.

To the officers and members of the Michigan State "Round-up" Farmers' Institute:

Your committee on resolutions beg leave to report as follows:

WHEREAS, It appears from the successful results of two years' efficient work in almost every agricultural county in the State, that the Farmers' Institutes furnish the best means of general agricultural education, very difficult in many counties to be obtained in any other manner; and

WHEREAS, We believe that the work of the past two years amply demonstrates the fact that there is an urgent need of a continuance of the same, and a gradual extension of the educational benefits to all classes of our agricultural population, thereby securing better citizenship, more prosperous agriculture and happier homes; therefore

Resolved, That we most respectfully petition the Honorable Senate and House of Representatives now in session at Lansing, to make appropriations ample in amount to successfully carry on this important educational work with its increasing demands; and be it further

Resolved, That a copy of this resolution be signed by the chairman and secretary of the Gratiot County Farmers' Institute Society and forwarded at once to our representatives and senators at Lansing as a wish of this representative body of farmers now in session at St. Louis, Mich.

Resolved, That we extend our thanks to the Board of Agriculture, officers and professors of the College, and to the large number of earnest, faithful workers throughout the State who have so largely contributed to the grand results of the Institute work during the past year; and that especially would we commend our efficient co-laborers in the Women's Section and recommend its continuance and extension.

Resolved, That we extend to the Gratiot County Institute Society our hearty thanks for all the many courtesies so gratuitously shown us, and to the hotels, business men, and citizens of St. Louis for the kind attention shown, and the able manner in which they have contributed to our pleasure and comfort, and to the success of this Round-Up meeting of the Farmers' Institute Societies of Michigan.

Resolved, That to Mr. Charles Bartlett and wife, for music; to Mrs. Mattie A. Kennedy, for recitations; and to Supt. K. L. Butterfield for untiring efforts in the management of this Institute, we are under lasting obligations.

Resolved, That we commend the holding of conference meetings of Institute workers, and of officers and delegates of local Institute societies, as one of the best features of these Round-Up meetings, the value of which cannot but be apparent in all future work throughout the State.

A. E. PALMER,
W. C. STUART,
CHARLES S. KING,
Committee.

Each of the foregoing committee reports was accepted and adopted.

It was also

Resolved by the Gratiot County Institute Society, That we extend our sincere thanks to the State Board of Agriculture, for locating the Farmers' Round-up Institute in this county, and for the efficient aid sent out by them, who contributed so largely in giving to the farmers of Gratiot County the richest treat they ever had; be it further

Resolved, That we tender our sincere thanks to the citizens of St. Louis for their untiring efforts in helping us to secure the Round-Up Institute, and for the financial aid which they have given us.

SOME INSECTS OF THE ORCHARD AND GARDEN.

PROF. W. B. BARROWS, AGRICULTURAL COLLEGE.

Insect injuries may be avoided in several different ways; they may be prevented, sometimes altogether; they may be lessened even after a beginning has been made; or the insects themselves may be exterminated only after the crops have been rendered worthless. In a few cases it may become necessary to abandon the cultivation of a particular crop—at least temporarily—so that the enemies of that crop may be forced to starve.

It is my present object to take up some of the more common and injurious insects of our gardens and farms and show how they can be fought most successfully and what principles should guide us in attempting to meet a new and unknown enemy of any crop.

Among our more common pests may be mentioned the—

Canker-worm,
Codlin moth; "apple-worm,"
Tent caterpillar,
Tomato-worm,
Cabbage-worm,
Potato-bug or Colorado beetle,
Flat-headed borer of apple and pear,
Round-headed borer of apple and pear,
Peach-tree borer *(Sannina)*,
Peach-twig moth *(Anarsia lineatella)*,
Raspberry gouty-gall *(Agrilus)*,
Currant borer,
Currant span-worm,
Cucumber beetle,
Squash bug,
Cut-worms,
May-beetles,
Strawberry weevil *(Anthonomous)*,
Clover-leaf weevil,
Plum curculio,
Scale insects or bark-lice,
Plant lice,
Rose-beetle,
Hessian-fly,
Army-worm,
Pea and bean weevils,
Carpet beetles and clothes moths,
and a host of others.

In dealing with some of these insects only protective measures are possible; with others aggressive action is necessary, while in the majority of cases both methods of treatment may be employed to advantage. Among

PROTECTIVE MEASURES

we may mention three subdivisions:

1. Mechanical methods.
2. Repellants.
3. Farm methods.

1. *Mechanical Methods:*
   a. Wool bands for cut-worms and canker-worms.
   b. Paper, plain or tarred, wrapped about tree-trunks and fastened to keep off peach-borers, apple-tree borers, etc., or about stems of cabbage, etc., when setting, to keep off cut-worms.
   c. Tar, "dendrolene" or "raupenleim" for same purpose.
   d. Wire netting, painted, from ground to first branches,—for borers.
   e. Nettings over willow-hoops for cucumbers, squashes, etc.
   f. Furrows ploughed around fields to hold in or keep out army-worms, etc.

2. *Repellants:*
   a. Camphor, napthalene, cedar oil, etc., for household pests.
   b. Borax for roaches.
   c. Tar or tar-oil for cut-worms (soaking seed).
   d. Turpentine and plaster for squash-bug.
   e. Carbolic acid, carbolized lime, etc., for maggots.
   f. Whitewash to prevent egg-laying by borers, as well as for other purposes.

3. *Farm Methods:*
   a. Cleanliness; clean culture, destruction of weeds; removal of crop remnants, old cabbage stumps, squash-vines, fallen fruit, rubbish. Use whitewash freely on fences and buildings. Destroy corn stumps by ploughing or burning.
   b. Fall ploughing—especially of sod,—for cut-worms, wire-worms, white grubs. Usually the later the better—e. g. for root lice and ants, sometimes earlier for root web-worm and some cut-worms.
   c. Rotation of crops—Let plants belonging to different families follow each other. For example, let corn be followed by something else than grass or wheat; get clover in as often as may be, but not after peas; do not follow cabbage with turnips or radishes, or potatoes with tomatoes or egg-plant.
   d. Use commercial fertilizers in place of barn-yard manure if cut-worms, white-grubs, or wire-worms abound. If the barn manure is used, mix with air-slacked lime or kainit before using—to kill insects and their eggs.
   e. Keep all crops vigorous.

IN DESTROYING INSECTS

three subdivisions may be considered:

1. Stomach poisons, for biting insects.
2. Contact poisons, for sucking insects.
3. Mechanical methods of killing.

1. *Stomach Poisons:*
   a. Arsenic compounds—
      Paris green,
      London purple,
      White arsenic,
      Arsenite lime,
      Arsenate of lead.

b. Spraying—
   1. Use plenty of lime.
   2. Spray on a cool day or in the morning.
   3. Use hot water in slacking lime; with Paris green 1 lb. to 200 gals. water with arsenious acid 1 lb. to 500 gals. water and 2 lbs. lime.

c. Dusting—
   Use 1 lb. Paris green to 100 lbs. gypsum or air-slacked lime.

d. Bran dough—
   1 lb. Paris green and 50 lbs. bran, mixed dry, then moisten; add molasses or not.

2. *Contact Poisons*—or Irritants (for sucking insects):
   a. Kerosene,—as kerosene emulsion.
   b. Caustic soap,—"whale-oil" best.
   c. Lye—Potash or soda.
   d. Buhach, or Persian insect powder (Pyrethrum).
   e. Hot water.
   f. Bisulphide of carbon.

3. *Mechanical Methods:*
   a. Jarring on sheets for curculio.
   b. Hand-picking large caterpillars and eggs.
   c. Cutting out borers.
   d. Trapping,—as moths at night, cut-worms in holes or under chips, and squash-bugs in same way.
   e. Rollers.
   f. Hopper-dozers.

In addition, there are a number of miscellaneous methods which may be employed with varying success, or for particular crops. Among the more important may be mentioned:

1. Burning, as of grass land or stubble from which an infested crop has been cut.

2. Flooding, as for some cranberry insects and others.

3. Utilization of domesticated poultry and wild birds. Poultry may be trained to eat grasshoppers, cutworms, army worms, and even potato bugs. Wild birds can be very largely increased by planting shrubbery, providing boxes and other artificial nesting places, and by protecting all harmless birds which nest on the farm or about the house. Regular feeding of winter birds by hanging bones and suet in the orchard trees will pay a heavy return.

Finally, remember that at the Agricultural College there is always an entomologist who can give you information as to the nature and habits of any insect which troubles you, and can usually suggest some method of lessening the injury or avoiding it altogether, if you apply to him in time. In asking for information or advice in such cases, always, if possible, send at least one specimen of the insect which is doing the damage, and also a sample of the work, if practicable. If the specimens are sent in a separate package from the letter, be sure your name and post-office address goes with each. For advice with regard to insects of any kind write to the Entomologist, Agricultural College, Mich.

DISCUSSION.

Q. At what time of year do cutworms lay their eggs?

Prof. Barrows: That depends on the variety, but usually from the first of July to the middle of August. They then keep on growing until cold weather.

Q. How do you fight the cabbage worm?

Prof. Barrows: On a small scale by applying hot water, almost boiling. This will not hurt the cabbage if the sprinkling pot is not held too close. Spray with tea from buhach. Spray with Paris green before the cabbage begins to head, but not afterwards.

Q. Does the tobacco worm work on the potatoes?

Prof. Barrows: Yes, sometimes; it works on the Jamestown weed also. It is seldom found on potatoes, however.

Q. Will not plowing the sod check the cutworms?

Prof. Barrows: Yes, but do not sow rye or any other green crop at once, but starve the worms out by clean culture.

C. B. Cook: Will not the application of paper as you recommended to the trunks of trees injure the bark?

Prof. Barrows: No; I would leave a space between the paper and the tree, tying a string loosely around the top. Remove the paper gradually, so as not to endanger the bark by sudden exposure.

Q. How is carbon bisulphide?

Prof. Barrows: It is all right if properly applied. Plant lice are killed by the vapor, but the plant to which it is applied has to be covered to include the vapor and precaution has to be taken to prevent freezing the plants by too rapid evaporation. It is used also for killing root lice by forcing it into the ground with a nozzle, but the root lice may be circumvented by making the soil rich with potash.

Q. Can you use Bordeaux mixture to prevent the curculio on the plum?

Prof. Barrows: I do not think that Bordeaux mixture would have any effect on the curculio, you would have to use Paris green, and whether that kills the adult insects or the young larva I do not know. It is effective however.

Mr. Brundage: Do not these sprays do damage by killing the lady bugs?

Prof. Barrows: These little beetles live on other insects for the most part; if they are plentiful enough to keep down the harmful insects it is good policy to leave them alone. Against plant lice you may use kerosene emulsion strong enough to kill the lice without damaging the lady bugs.

Mr. Shively: Can we not hang a bottle in the tree properly baited to catch the codlin moth.

Prof. Barrows: I hardly think this a good plan, since you will catch other insects as well and may kill as many friends as foes.

THE STRUCTURE OF THE MILK GLANDS OF THE COW, AND DISEASES PECULIAR TO THEM.

DR. E. A. A. GRANGE, AGRICULTURAL COLLEGE.

In bringing the subject of this discussion before you at this time I desire to describe, somewhat briefly, the anatomy of the milk apparatus, in order that we may have an intelligent understanding of the parts affected in those diseases which I intend to discuss. I do so because I believe that a knowledge of the anatomy of the part is necessary so as to treat diseases successfully, as well as economically; indeed I am strongly inclined to believe that we too often fly to the more practical side of the question, the cure, without stopping to investigate the kind or quality of the tissues we are trying to produce the desired change upon. Andthus much valuable time, and even money, is lost by groping in the dark. Let me illustrate. Some years ago I was proceeding with my usual class exercises at the Agricultural College, when some visitors came into the room; among them was an experienced horse breeder. Now it happened in the course of my talk that I spoke of the increased prominence of certain lumps to be found on the legs of some horses; I stated that they were not to be regarded as disease, but rather the natural condition of things, and consequently should not be interfered with by any line of treatment. At the close of the discussion the gentleman just referred to came to me and said, "I am sorry I did not hear you talk twenty years ago, for I have spent a good deal of time trying to blister off those lumps, and have repeatedly wondered why it could not be done; but the explanation is clear to me now that I have learned they are natural growths." It is, perhaps, unnecessary for me to say that had that gentleman understood a little more about the anatomy of the part he was doctoring he could have saved himself some expense, as well as the unfortunate animal much pain.

I have related the foregoing, not for the purpose of introducing my subject, but rather with the hope of stimulating a desire in some of you to investigate for yourselves concerning those parts which I intend to talk about. You may do so by securing an udder from a slaughtered animal; after which dissect it carefully, something after the plan which I will suggest, and by doing so I feel certain that your interest in the natural, as well as the diseased, conditions of these glands will be much increased.

ANATOMY.

Viewing the external surface of the udder we find it covered with more or less delicate skin, and divided into two parts, each part having two teats. Proceeding from this and on removing the skin, we will find a peculiar arrangement of tissue, which may be inflated in any direction with air; this shows it to be composed of a multitude of cells, connecting with

one another, and on which account it is called by anatomists cellular tissue. It serves as a bond of union between the skin and deeper-seated parts. It is interesting to us because it is sometimes affected with a disease, which may be mistaken by those who are not conversant with the anatomy of the part for a much more serious one than it really is. The cells forming this tissue may be filled with fat, or other substance, giving the entire organ an enlarged appearance, while the glands themselves may be small, or even insignificant, which is one way of accounting for the term beefy or meaty udder. On peeling off this cellular tissue we come to an elastic skin-like substance, which may be regarded as the proper tunic of the gland, as it is more substantial and envelopes the organ in such a manner that a very perceptible groove is seen between the glands on one side of the body and those of the other. On removing this elastic tissue we come to a sponge-like material, which is the true gland itself. I compare this to a sponge because on cutting across it we find the surface pierced in every direction by holes, giving it somewhat the appearance of an ordinary sponge. If we follow these holes into the tissue we find that they are tubes, which keep getting smaller and smaller, until they are lost to the unaided eye. But during their course it will be seen that they are pierced by other holes, which represent the openings of smaller tubes, and so on and so on, until we finally have the glandular substance reduced to a frame work of innumerable branches, which eventually terminate at their small ends in numerous secreting cells, so arranged that they closely resemble a bunch of grapes; hence the term, racemus, which is the name applied by anatomists to various glands formed like the udder.

(Here an illustration was used in the shape of a chart, without which it is not easy to understand this part of the address.)

Having traced the lactiferious ducts, as these tubes are often called, to their extremities in the deep-seated structure of the gland, let us reverse this order of things and trace them from their secreting extremities to the free opening of the teat. Beginning at a round cell we find a tube running from it which soon unites with a tube from another cell, both of which are so small that they can not be seen with the unaided eye.

THESE CELLS, WITH THE TUBES COMING FROM THEM,

keep uniting until larger tubes are formed, which may be familiarly likened to the main stalk of a bunch of grapes. This bunch, if it may be so called, constitutes a single system, as it were, and this single system unites, or goes into partnership, with the stalk from another branch or system, and this sort of union of the stalks or tubes goes on until they become vessels of considerable magnitude; so much so that we can insert the end of the finger into many of the largest of them. These giant tubes, if I may express it in that way, converge towards a common center, which is called the milk cistern, and is contained largely within the walls of the teat itself. The lower end of this cistern, which is towards the free extremity of the teat, is provided with an arrangement of circular muscular fibres passing around the duct. These muscular fibres, by contracting, keep the external orifice of the teat closed. By

application of moderate pressure on the upper part of the milk cistern, and in a manner which must be familiar to you all, the milk is forced down to the lower part of the cistern, and the muscular fibres expand sufficiently to allow the milk to pour into a pail, for instance. The teat itself is made up of a peculiar tissue, which, under certain manipulation, becomes considerably enlarged; this singular provision of nature allows the milker to operate with more facility, or the calf to suck with greater ease. In the cow the usual number of teats is four, each one receiving the milk from a corresponding gland; so in the cow the two primary sections, or external halves of the udder, are again subdivided, giving rise to what are called the four-quarters. In dissecting the udder I have never been able to show a distinct line of demarkation between the quarters of their respective sides, but when we inject them through the teat with some colored fluid we soon see that the tubes radiating from the milk cistern of one teat compose a separate and distinct system from those which radiate from the cistern of the neighboring teat. So the cow may be said to have four glands, and it is well known that these glands may be affected with disease independently of one another.

Besides the tubes and cells already mentioned, we have

BLOOD VESSELS, NERVES AND LYMPHATICS

entering into the formation of the udder. The blood vessels are of two kinds; arteries, which bring the blood from the internal part of the body to the glands, and from the blood contained in these arteries the milk is partially formed. The veins carry the blood away from the glands. The former, the arteries, which are to be found about the middle of the inside of the upper part of the thigh, upon entering the substance of the gland break up into innumerable twigs. The latter, the veins, are somewhat differently arranged, there being two sets, one passing along the bottom of the body, which they enter near the breast bone; the others accompany the arteries and return the blood to the economy at a point which is not within our vision.

The nerves supplying the udder possess a great deal of interest, for it is through their influence that the quantity of the milk is determined, and they must be kept in good humor, so to speak, before we can hope for the gland to do its best work.

While there is a great deal of mystery surrounding the secretion of milk, yet sufficient is known to show that

THE OPERATION OF MILKING A COW

is an art which may only be profitably practiced by careful people, manipulating the gland in a proper manner. The nerves which supply the gland belong to the class of mixed nerves, and intermingle more or less with what is called the sympathetic system, which to a large extent controls the supply of blood going to the part. Now if these sympathetic nerves are not kept in good humor they will cause the blood vessels to contract, which cuts off the supply of blood, and with it the supply of milk. But as you say the gland already has its full complement of milk;

what then? Well, that may be true, but it has been shown time and again that the milk tubes or ducts of the gland of a cow are not capable of holding nearly all the milk which may be extracted at a single milking; and as a considerable proportion, especially the fluid part, is obtained directly from the blood, it stands to reason that we must have a liberal supply of that fluid to the gland, so that we may obtain a liberal quantity of the necessary elements, to form the milk from it.

Besides the nerves and blood vessels in the gland we have numerous lymphatics, which are there for the purpose of removing those portions of the glands which have performed their functions and are of no further use.

Having said this much about the anatomy of the gland and the secretion of milk, let me turn for a few moments to some of the diseases of this apparatus. I will first take for discussion a condition which I believe causes the most pecuniary loss to the farmer or dairyman, and is known as

GARGET OR CAKED BAG,

more technically called "Mammitis." This disease may be defined to be inflammation of the udder, and arises from a variety of causes, all of which should be thoroughly understood before we can hope to deal with the disorder in a successful manner. The causes may be considered under several heads, such as mechanical, constitutional or pre-disposing, and environment or atmospheric. Of the mechanical causes let me say that carelessness in milking plays a prominent role, and the disease may be produced by not sufficiently stripping the gland; rough handling during the act of milking; external injury from a blow of some description, the kick of a rough attendant; the tread from a neighboring cow while the afflicted animal is lying on the ground, an accident which is not at all infrequent when cows are kept in stanchions; the bunts from a sucking calf, etc. Overstocking, that is, not milking at the proper time, will often cause this disorder. Constitutional or predisposing cause: animals afflicted with certain diseases liable to be affected, tuberculosis, foot and mouth disease, and cow pox are one and all causes of this disorder. Animals which are deep milkers may be said to be predisposed to the complaint. Environment or atmospheric causes are far from uncommon: exposure of the gland to a cold wind, in the nature of a draught, when it is in its most active state of lactation, as it often is a few days after calving. While the environment of an atmosphere laden with contagious germs may be a fertile source of the complaint, indeed it sometimes occurs as an enzootic. Recent investigations have shown that it is produced by a specific organism, which from the peculiarity of growth is called "Streptococcus." So the disease may be of a communicable nature, which suggests the great care necessary in handling a herd when several animals become affected, and the milker can not be too particular as to the cleanliness of his hands, for the disease may be carried from one animal to another by them.

Symptoms.—The disease is usually confined to one gland; there will be more or less heat, pain and swelling. Clotted milk will often be the result of this disease; occasionally milk will become bloody. The gland

will sometimes, in chronic cases, become hard and remain as an indurated mass; in others it will mortify and drop off altogether.

These are only some of the prominent symptoms, many others accompany individual cases.

Treatment.—Too much stress cannot be laid upon the importance of thoroughly applying our curative agents in the earliest stages of this disease; for if we can succeed in subduing the inflammation before the gland cells become materially affected we have every reason to hope that a desirable termination of the inflammation can be brought about, in which case the tissues will be restored to their normal condition without interference to their functions, and the gland will be saved. But if the disease once gets a firm foothold in the gland, it is questionable if it can ever be completely restored, although the degree of restoration varies very much with individual cases.

Speaking of the treatment in a somewhat summary manner, fomentations of warm water should be thoroughly applied for at least half an hour three times a day for four days, if necessary. Poultices applied to the gland, if properly put on, will have a good effect. The application of olive oil and camphor, in the proportion of one part of camphor to twenty parts of olive oil, will make a convenient remedy to apply as a liniment. The animal should be fed, while affected with this disease, sparingly for a few days, and those foods which tend to produce a large quantity of milk should be avoided within certain limits. The bowels should be further emptied by administering a purgative, say a ponud of Epsom salts; if they do not act more or less energetically in the course of twenty-four hours, diuretics may be given, and a good one is an ounce of salt petre three times a day for four days.

MAMMARY ŒDEMA.

is a disease which is sometimes mistaken for caked bag, from which it differs, however, by being situated in the cellular tissue, between the elastic covering of the gland and the skin. While it not nearly so serious a disease as the former, yet it often occasions much alarm amongst those who are not conversant with the anatomy of this part of the animal. It is more like urticaria or nettle rash than any disease I know of, inasmuch as it behaves like this disorder in many of its most apparent symptoms. It occurs usually about the time of calving, that is, a few days before or a few days after. The cause is wrapped in considerable obscurity; it appears to be the result of some mysterious derangement of the digestive organs.

Symptoms.—It invariably comes on suddenly; a cow being left in perfect health at night will be found the next morning with her head perhaps twice its natural size. Then we observe other parts of the body, and may find that the udder is swollen up to a very great extent. In many cases this sudden swelling confines itself entirely to the udder, hence the term Mammary Œdema, but in perhaps the next animal affected the disease will be confined entirely to the head. It is as affecting the udder that I wish to speak more particularly today. When it becomes affected, usually the whole surface of the organ is increased in size, but

careful manipulation will enable those who have given attention to the anatomy to determine that this swelling is outside and beyond the elastic tunic previously referred to, between it and the skin. By manipulation of the part we find a doughy-like feeling, indeed our fingers will produce pit-like depressions upon the surface. The surface of the skin occasionally has a somewhat red, shiny appearance and may be more or less tender; the teats hard, especially at their bases.

Treatment.—These are the salient features in the symptomatology of this disease. The treatment should be directed first of all to the alimentary canal, as it is thought the disease, in a more or less mysterious manner, originates from some disturbance of this tract, consequently change of food in the shape of laxative diet and aperient medicine should be given, which may be followed with diuretics. Amongst the aperients a dose of, say one quart of raw linseed oil is good, while the diuretic (which should not be given for two days after the oil), may be composed of nitrate of potassium, say one ounce three times a day for three or four days.

The local treatment consists in the application of warm fomentations, or poultices, to the part. If warm fomentations are used the temperature of the water should be about 105 degrees Fahrenheit, the application of which should be kept up for at least half an hour at a time, three times a day for three or four days. Often one day's application will be all that is necessary.

AGALACTIA.

This may be defined to the absence of milk in the mammary gland; it sometimes occurs in the young cow, especially after the first birth. It is a condition which is due in some instances to improper care in the shape of insufficient nutriment in the food; in other cases it occurs without any apparent cause.

Symptoms.—The gland is soft and flabby; all efforts to milk fail to produce the desired effect, only a little watery fluid resulting from the manipulation of the gland.

Treatment.—Good food, good care, and alteratives in the shaps of tonics should be given. A favorite prescription with the speaker is four drams of fenugrec, two drams of anise seed, one dram of sulphate of iron. Mix these ingredients together and give in the form of a powder three times a day.

Local treatment.—Hand-rub and knead the gland gently several times a day; go through the act of milking frequently, at the same time being careful not to irritate the gland by undue traction on the teat.

CHAPPED TEATS

is a condition which often annoys those engaged in dairy work. They are the results of a variety of causes, such as pulling at the eminence with undue force and a rough hand, especially in cold weather; while in the summer time they are sometimes aggravated by micro organisms, which are often to be found floating in the air of a moist, warm atmosphere.

Symptoms.—Cracks or fissures, which frequently run in a transverse direction of the long diameter of the teat, though they may run from above downwards. The fissure, if such it may be called, will sometimes resemble the crack so common in people's lips, more than anything I can think of. An irritating fluid will sometimes ooze from the bottom of the fissure, causing it, and the parts beyond, to become hot, swollen and painful, when the cow will kick at her attendants on slight provocation.

Treatment.—In bad cases the part should be washed with some soothing foment, say warm water, to which a little soap may be added. After the organ is thoroughly cleansed the soap should be washed out of the fissure by sousing it with plain, warm, soft water. After this, apply some astringent lotion; a good one consists of one part of compound tincture of benzoin and one part of oil of tar. This should be applied wit a camel hair brush, and confined to the cracks; if it spreads all over the surface of the organ it makes it disagreeable to handle for a day or so after it has been applied.

There are other diseases of these parts, but the time allotted for the discussion of this subject has drawn to a close, so I will now leave the question in your hands.

DISCUSSION.

Q. Is caked bag contagious?

Dr. Grange: It is sometimes. Where the cause of the inflammation is a microbe the disease may be transferred from one quarter to another of the same udder or conveyed to another cow by the milker.

Q. Are not cold applications as good as hot?

Dr. Grange: I never used cold applications for the udder. It might do in the summer but for general purposes I would recommend hot fomentations.

Q. How shall we feed cows to prevent milk fever?

Dr. Grange: I do not think that you can so feed the cow as to insure yourself against her having the fever. By all means feed so that the bowels will be loose and do not feed high.

Q. Where after the birth of the calf the udder is still inoperative, what is to be done?

Dr. Grange: The only thing to be done is to foment with warm water and manipulate.

A. M. Welch: Most of these diseases of the udder call for prevention rather than cure. Give before the calf comes warm mashes and salt, and do not give a fresh cow cold water. Although I keep thirty and forty cows I never have a case of milk fever, and I attribute this freedom from disease largely to the fact that I never give a cow cold water for the first few days after calving.

Dr. Grange: I do not agree with Mr. Welch. This idea of giving nothing but warm water is not so much recommended as it was twenty years ago. I believe that a limited amount of cold water is rather beneficial than otherwise.

THE CLOSE OF THE INSTITUTE.

Hon. C. J. Monroe: Permit me at the close of this Institute to speak in behalf of the State Board of Agriculture and to express their thanks to the Institute association of Gratiot county for the splendid manner in which they have laid the foundation for this successful Institute, have cared for both speakers and people during its continuance, and have provided just the enthusiasm necessary to make the meeting a success.

We thank also the people of the vicinity for your attendance and the intelligent manner in which you have taken part in the discussions. We hope that you will carry home with you many ideas that will be helpful to you in your everyday work.

WOMEN'S SECTION.

MRS. MARY A. MAYO, CONDUCTOR.

TUESDAY AFTERNOON.

Mrs. Stiles Kennedy, presiding.

Necessity compelled the placing of Friday's program Tuesday afternoon, the latter coming Wednesday, and so on.

THE IDEAL HOME.

MRS. STILES KENNEDY, ST. LOUIS.

Perhaps in nothing is the limitless power of God more beautifully shown than in the stamp of individuality impressed on each of the countless millions that have come forth from His hand.

Perhaps in nothing is the goodness of God made more manifest than in this individuality. It is the secret of the pleasure that human beings give each other, and in no place is it more strikingly manifest than in the home. Each one's peculiar ideas and disposition constitute the secret of her ideal home,—and the ideal home of one woman is not the ideal of another. The quiet, peaceful, elegant home of one woman is her ideal; the comfortable, cosy, noisy household fills the heart of a mother with entire satisfaction. But I know of a quiet, peaceful, elegant home where there are no children, and yet there reigns such a cosy, comfortable, welcome atmosphere, that when I enter there I almost unconsciously expect to see the children, and I often do, but they are some one else's children.

It matters not if the home be luxurious or simple; a palace or a cottage; it is only necessary that it be clean and *peaceful*, that the influence be pure and elevating. Man's capacity for good and evil is developed by the influence of his home. It will not be "all the same in a thousand years," if the influence of your home is not as pure and high as it should be. I think there are a few esentials to the perfect home that stand out so prominently above all others that I cannot but mention them.

I think I am not claiming much when I count *flowers* among the things that make for our best good and happiness. Good, wholesome food is also such a source of good feeling that it is one of the essentials of home contentment. Possession is nine points of the law, it is said. It bears the same relation to happiness in the home—own your homes and you will enjoy every plank in the building—every flower that raises its sweet

face to say good morning to you. But the gist of the whole matter lies right here; that each constituent shall take pleasure in making sacrifices for the good and happiness of others. As soon as you learn to sacrifice your pleasures and your notions for the benefit of others, and realize that others are constantly making sacrifices for you, just so soon will the angel of all peace and harmony reign supreme in your household.

Earth yields her rarest fruits and choicest delicacies for the gratification of man's palate. He inhales the perfume of the morning, with its invigorating breath, revels in charms of music, and is enraptured with the panorama of beauty nature everywhere presents to his appreciative eye. But it is in his own home that peace and joy fill his heart and soul and raise his thoughts to high and noble truths and principles. As the chords of the harp yield their sweet sounds to the touch of the performer, so the chords of this living instrument (curious instruments of God's handiwork), operated upon by the influence of his *home surroundings*, yield to the ear and eye and every sense the richest pleasures of fruition.

DISCUSSION.

Miss McDermott: We all realize the fact, or we should realize the fact, that a woman has more influence in a home than a man has. We have all heard it said that "the hand that rocks the cradle rules the world," and it has proved true. If we glance back at some of the great men we will see that the influence that the mother had on that man's life has simply been told when his life is more mature. The mother's influence is felt in more ways than she realizes; it is the mother who influences the children even in what they eat. I remember in my own home, we, as children, would not eat the dishes that our mother would not eat, because we thought if she did not eat them they were not fit to eat. The influence a mother has in a moral way is great; she can chide them in a way they will take so much more lovingly than the father can, a mother's influence so overbalances it that it seems almost divine.

We often speak about the work a mother has to do in her home, that it is hard, and that she gives this impression to her children and that a woman's life is a drudgery at the best. But when you stop to think of the love that lies behind that drudgery, it seems to me, if it were not for this love it would be drudgery, but because of this love it makes it almost divine.

It seems to me the most desirable thing for us to do is to cast a pleasant influence around our homes. One valuable thing to do is to make our meal times interesting; not have a cross word spoken there, but that meal time should be held purely for social talk. It seems to me it will not only have an influence of the life hereafter, but it will have such an influence upon the digestive organs. The fact that a happy disposition aids digestion has been emphasized.

Miss Lewis: To me the most sacred words in the English language are home and mother. I think we all appreciate that fact, and I think one of the happiest things when we have been away from home is to return home to our mother. We should in everyday life try to make our homes interesting. I think, too, we owe a great deal to our mothers, who make a great many sacrifices for us. Then, too, we do not think enough

about our homes; our work. All of us have some work to do; it may be only to wash the dishes, but we can make even the dishwashing interesting.

Mrs. Crandall: Home is the dearest word to me that I ever hear; perhaps more so because the dear beloved home of my childhood was so early broken up. There are so many things that come in to make an ideal home that no one of us could speak of them all. Love is the ruling feature of an ideal home. Then comes politeness, each member of the family should be polite to all the other members of the family. Then come the countless little things that I will not attempt to speak of. I have always felt in my own home that I wanted people to feel "at home" in my home; especially the children. I don't want them to feel that if they misplace a chair or pick up a book they are doing something wrong. I think an ideal home should be a home to children and to young men and women who have no homes of their own.

Mrs. Mattie A. Kennedy: There are so many phases to this subject of home making. It seems to me that one part of the ideal home is the home maker herself. In this home should be pleasantness, neatness, and punctuality; pleasantness before all things, then neatness, not painfully neat. We have those among us who are so painfully neat that it is painful to come in contact with them. This idea of glorifying our work is a very pleasant one to me. And Mrs. Mayo touched upon the subject of gradually growing apart in the home and the children growing away. Let me tell you that if in your own heart you consider your work hard and a drudge that your children will inherit that idea and get out of it just as soon as they can.

BEING A HELPMEET.

MRS. MATTIE A. KENNEDY, SLOCUMS.

"And God said it is not good that man should be alone, I will make a helpmeet for him."

When a girl arrives at the age of memory, she begins to plan for and dream of a home of her own. From this time on, until womanhood comes, she indulges in dreams and air castles of what the future shall be, and pictures her prince, and her pride in him, in rosy hues, and lives in one exquisite day dream. The panorama of humanity passes before her wondering eyes, and while not clearly understanding all its phases, yet the instinct of life is alert and watchful, and she is reviewing her associates, one by one, as they pass into and out of her life, scanning them with critical eye, that if her prince be among them she should not fail to recognize him. Not that she is conscious of this scrutiny; it is but the exercise of an instinct, either planted in her breast or it has grown with her growth.

By and by the prince comes, the heart recognizes his sovereignty. The long sweet days of probation are over; the mystic knot has been tied; the friends who have been bidden to the feast have given them Godspeed on their journey together, and she has entered upon her life of a helpmeet.

Now comes the making of the home nest, and here is where you may display the best that is in you, for while it is your house and you are the keeper of it, remember that it is *his* home, and you are the keeper of that also. If there are some things he wishes to add to that home, of which you do not approve, if you cannot give a valid reason for doing without it, say nothing, but care for those things as conscientiously as for the rest.

So much for the *house*, now for the *home*. The first thing, the best thing and everything, is a contended mind, and never forget that the sweetest face is the cheerful face. Who has not felt its electrifying influences? One cheerful face in a household will keep everything warm and bright within. It may be a very plain face, perhaps positively homely, but it is never repulsive, and there is something in it that we feel but cannot express. Its cheery smile and warm welcome causes the blood to dance and warms the heart with joy. There is a world of blessed magic in the cheerful face and we would not exchange it for the most exquisite beauty that ever graced the human form, if the beauty looked through soulless eyes. I do not believe in the endless smile so much quoted in newspapers and so profusely sung by poets. If the bread sours and the pudding scorches that smile is apt to degenerate into a hopelessly empty mask that does not cover the volcano that rages within. The woman who constantly decorates her face with that idiotic smile may be put down as deceitful and one whose friendship we may be chary of confiding in. She will betray her most intimate friend and still smile on. Shun her as you would a cyclone; shun her as you would a serpent in Eden. You will always know her by the lack of soul behind the smile; the cold hard glitter of the eyes, while only the outward muscles of the face are drawn into the semblance of that heaven-born sunshine of the human soul—the real smile—that which looks out of eyes whose pure limpid depths express love, truth and purity. No matter what our trials in life may be, we may still be cheerful, and making the best of things not just to our liking, help and encourage our "best half" on the journey of life.

ONE OF THE GREATEST HELPS IS

accomplished by acquiring a knowledge of the business of the firm and expressing a willingness to assist in its responsibilities and carry it on in emergencies. If we have a natural disinclination to master business forms and details, we would in our own interests, as partners, understand enough about our bread and butter resources to give it intelligent supervision in case it becomes necessary. Especially is this true on the farm. It does not require more than ordinary intellect to know how to feed and care for stock properly. Apart from the pleasure one is sure to derive from the knowledge and companionship of dumb animals, there is an exquisite satisfaction gained in the feeling of independence.

It only takes a short time to learn how to properly feed and care for horses and cattle. When this is accomplished we have lost any fear we may have had of them. Only a little time is needed to learn how to harness and drive a horse. A woman who knows enough to peel potatoes can certainly understand how to turn swill into a trough and

keep the trough clean. It does not require any longer time to learn to milk than it does to harness a horse, and when it is done we are independent. If the husband is called from home, or is taken suddenly ill, and no man can gauge the duration of a sick spell, with what pride and contentment he will reflect upon the fact that his business is not left in the hands of an inefficient or ignorant person; what satisfaction it is to yourself to know the faith that he has in you and that he is spared the worry of knowing things are going half done or undone, and you do not need to fret because things are going wrong and you unable to stop them or better them. Worry kills more men than work. You may not always, perhaps never, have to perform this work with your own hands, but if you know how you can give intelligent direction and insist upon its proper performance. It is a knowledge that certainly will not harm you. You can be just as good a scholar, just as good a musician, be able to entertain as well, be as good a housekeeper, as good a home-maker, be a lady at all times and in all places, and have this knowledge and know how to apply it.

Learn these things while you are young; while you are making your home; before the little babies come, and you will find before you are done with life that it has saved you many dollars. A dollar saved is two earned; added dollars means added comfort; added comfort means contentment and happiness.

If you are not willing to identify yourself with your husband's interests you had better remain unmarried. If you are determined to live a separate life, except at the table and the pocketbook, better stay single for only a life of misery and discontent is before you. There is but one exception I would make to this. If the man you have married forms a determination to go into the saloon business, I would seek by every means in my power to pursuade him to give it up. In the event of a failure in that, try and live just as pure and good a life as possible in the atmosphere of that business. We are seldom responsible for the business our husbands engage in after we are married. If the business is legitimate, legally and morally, we may if we try acquire an interest in it and be helpful; if it is not, we must live a pure, good life, and by our influence try to win him to a better way and help him to be a better man.

Another thing,

MAKE FRIENDS OF YOUR HUSBAND'S FRIENDS.

Let him feel he is at liberty to invite them in whenever he is so inclined. But with this privilege he should know there comes the responsibility of abundant provision of the raw material that is needed for the entertainment to which he has invited his friends. When they come give them a welcome that in itself is as good as a feast. It is not necessary to welcome strangers with open arms, but you can in your own sweet way make them feel that they are welcome to the extent to which your husband has invited them and because they are your husband's friends. By treating all men as if they were gentlemen, and as if it was impossible for them to be anything but gentlemen, you will not be imposed upon or treated with undue familiarity.

The turning point in many a man' life, from an indifferent to a brilliant success, dates from a dinner prepared and presided over by his genial, helpful wife. His guest will consider that if by his good sense and industry he was able to attract and hold such a desirable home-maker, and by her help to build up such a home, he is worthy of business confidence. The turning point in many a man's life from a rough to a good, moral, intelligent gentleman, has dated from a dinner to which he has been made welcome and treated as a rational human being by some other man's good wife. He has been able to see into the future, to realize the barrenness of the life which he is leading, and to desire for himself a duplicate of the happiness and comfort with which he has surrounded himself; to wish to acquire the qualities by which he has possessed himself of these things, and, with the example to remind him, has been able to live up to his ideal.

THE CHILDREN.

Sooner or later in our lives come to us the little babies, clamoring for love, care and teaching. I am so sorry they are barred from so many homes; I do not know how, but physicians can tell you; some are physically incapable of bearing children, some mentally, and some morally. Did you realize, my sisters, that when you took upon yourselves the duty and dignity of marriage you implied a willingness to assume a responsibility in this respect? And do you realize that you are committing a sin against your Maker, your husband, and yourself, when you refuse life to the immortal soul that has started into life within yourselves, bone of your bone and flesh of your flesh? The law of reproduction is one of the grandest laws of nature, and she who trifles with the delicate mechanism of that part of her body trifles with her life and throws away the life that has a right to recognition from us. I know that there is pain, suffering and misery attendant upon motherhood, but nothing good comes to us in life but that it is paid for in this way. Every joy and pleasure is paid for in its equivalent in pain. When our little babies come to us what lovely things they are. Who that holds her own baby close to her bosom, tastes the sweet baby kisses, feels the touch of tiny baby hands soft and sweet as rose leaves, watches the blind unquestioning love that endures all things, feels amply repaid for all she suffered in giving it birth. Then what joy comes to us in watching the tiny bud unfold into the perfect blossom of a beautiful woman or a noble man. What exquisite pleasure comes in teaching and training the infant mind to expand and reach out the strong arms of its intellect after knowledge and to show it the way to select the good from the bad. Oh, why are so many mothers possessed of so much false modesty that they shrink from discussing the vital questions of life with their growing sons and daughters? This knowledge will come to them, it must come to them, and is it not better to learn it from mother's lips of love and purity than to gain it from a vicious source with attendant vicious thoughts?

TEACH YOUR DAUGHTERS

that marriage is a natural state and maternity a sacred trust. That there is no disgrace but a glorious crown in bearing children in a legitimate state. The instincts of maternity are the first to develop in the mind of the child. This is shown in the tiny maiden as she cuddles her dolly before she can talk. Why bring her up in ignorance of that which is before her? Why teach her that motherhood is a burden too grevious to be borne? Teach your daughters the dangers that lie before them that they may not go out unarmed; teach them that men are differently constituted from women, that it is easier to arouse their passion than their love, and how to deport themselves to avoid this.

I sometimes wonder that the gates of heaven are not blistered by frantic curses, why the fires of hell are not quenched by the bitter tears of betrayed womanhood that has fallen *through ignorance*. Teach your daughters that marriage is a solemn, sacred thing, not to be lightly entered upon, trifled with and thrown aside; teach them that their bodies must be kept pure and undefiled if they would raise up a strong race of magnificent descendants; teach them to be honest and upright by being that yourself. Never promise your child anything when you know the promise will not be fulfilled. Your children learn the things of this life mainly from imitation, and if you deceive them you will soon find them deceiving you. If you promise them a pleasure, give it, if you find you cannot give them a valid reason; if you promise them a punishment for various misdeeds, and it is merited, visit it upon them, not as the outcome of your ill temper, but as something they have earned by misconduct. They will be as you are to them, and as they grow up they will mirror your daily life with them. Teach them the golden rule by living it yourself with them, and know that your daughter is going to be a loyal, noble woman; your son, such a husband to some good woman as you would have your own to be.

When you have fulfilled your promise of helpfulness, lived up to all the light you have in this direction, so far as this life goes, you may stand before your Judge with a clean record.

DISCUSSION.

Miss McDermott: A great many women say there are a great many men who are good enough for their daughters, but there are few, if any daughters, good enough for their sons. They allow the daughters of the family to wait on the boys; to go up stairs or down cellar to get things that the boy wants, instead of training him to be a model husband for some other girl. You know Oliver Wendell Holmes said that the time to begin to train a child was five hundred years before it was born. But we have nothing to do with the five hundred years before, and we are here, and have to meet the most vital question by beginning with the child. And in the home where the brother waits on the sister in a gentlemanly manner any mother would say, "he is good enough for my daughter." It is well enough to talk about women being model wives and helpmeets, but teach your sons to be equally helpful in this way.

Mrs. Stiles Kennedy: I think this is one of the most beautiful subjects in the world. In being a helpmeet you not only want to do your duty, and do it well; but you want to help your husband do his duty, and do it well. And the best way to do it, and do it right, is to convince him that you are perfectly conscientious in what you do. There should also be perfect confidence between husband and wife.

Mrs. K. L. Butterfield: The matter of confidence between husband and wife, and in order to be a helpmeet there must be perfect confidence, is very important. Each helpmeet has conditions peculiar to herself. We may have to study to find out little ways and little habits that we must find out to keep ourselves in perfect confidence.

Mrs. Mayo: I think we need to read the literature that our husbands are reading. As a farmer's wife I speak of this because it is said that our husbands go to the neighbors to talk, and that they stand on the street corners to discuss political questions. I believe in order to be a good helpmeet that we need to educate ourselves along the lines of the great questions that today are before the people. If we do not, we fall short of being a helpmeet.

Our husbands do like to discuss all sorts of questions. Can your husband discuss them with you? Are you capable of sitting down, and perhaps he take one side and you the other and discuss them, or are you sitting still, I mean mentally, and letting him go on and up? In a little while he will grow away from you. So frequently he never thinks to mention the fact that there is a great issue before the people to his wife—she don't know anything about it, she works and works and works.

The time has come when the American farmer must be the best kind of a farmer, it has also come that he must be improved in mind; not only to be the best kind if a farmer but to be the best kind of a man.

Mrs. Mattie A. Kennedy: It is just as impossible to lay down cast iron rules for a home as it is to try to rule the healthy appetite. We are all differently situated in our homes and in what we have to use in that home, and each one must "work out her own salvation" in this respect. Often where you find an extravagant wife you find an ignorant wife. Not one woman in a hundred will go beyond her means if she knows what they are; she knows the consequences.

Mrs. Mayo: I think the wife on the farm is the one that economizes the more of the two. I believe if there is any economy to be practiced she is the one to carry it to an extreme; the wife will pinch the closest and the longest and the most.

WEDNESDAY AFTERNOON.

DEMONSTRATION LECTURE IN COOKING.

DISCUSSION.

Mrs. Mayo: Would you wash a fowl and wipe it on the inside when you dress it?

Miss McDermott: Yes, for my own use I wash a fowl, and if it has stood for any time before it has been cleaned I wash it in soda water, which makes it cleaner than it would otherwise be.

Mrs. Stiles Kennedy: Why does a custard sometimes become watery?

Miss McDermott: Because it has cooked too long. If you leave a mixture of egg and milk near the heat too long it will curdle.

Mrs. Stiles Kennedy: When is the proper time to salt vegetables?

Miss McDermott: I put them in boiling salt water when I put them to cook.

THURSDAY AFTERNOON.

DEMONSTRATION LECTURE IN COOKING.

PROF. EDITH M'DERMOTT, AGRICULTURAL COLLEGE.

BREAD.

GENERAL RULES.

Use flour containing a large amount of gluten.

Flour should be kept in a dry place, and it makes better bread if heated just before using it.

The yeast must be fresh; compressed yeast is fresh when it is dry and crumbly.

If milk is used heat it to prevent the bread's souring, then cool again.

Milk and water are both used lukewarm.

Bread should be thoroughly cooked and kept in a tin box.

BREAD.

2 c. lukewarm milk or 2 c. lukewarm water, and 2 tsp. butter, 2 tsp. sugar, 2 tsp. salt, ½ cake yeast or 1 c. liquid yeast, flour 6½ to 7 c.

Dissolve the yeast in ½ c. lukewarm water, pour the milk into a bowl, stir in the sugar, salt and yeast, and when the sugar is dissolved add

flour gradually until a thick batter is formed; beat vigorously; add more flour until stiff enough to handle; turn it out on a floured board leaving the bowl clean, and knead from 20 to 30 minutes until smooth and elastic, so that when pressed by the fingers the dough springs back into place. Put it back in the bowl and grease the top with a little melted butter to prevent a tough crust forming; if a crust forms the dough will not rise well. Cover with a cloth and set in a warm place, and let it rise until double its bulk. The quantity of yeast in this recipe will raise the dough to double its bulk in about 6 hours. Test to see if it has risen enough by pressing it with the finger; if the dough does not spring back into its place readily it is ready for the second kneading.

Lay it on a board and shape it into loaves or biscuits; use no flour in the second kneading. Place in a greased pan, cover with a cloth and let them rise in a warm place until double their bulk. Loaves should be baked in a hot oven from 45 minutes to 1 hour, and biscuits in a hotter oven from 20 to 30 minutes. If the dough is mixed with water the butter should be added to prevent the bread from being tough.

BREAD MADE WITH A SPONGE.

Use the recipe for bread mixing in only flour enough to make a thick batter; beat vigorously and let rise over night; in the morning stir in enough flour to make a stiff dough and put to rise until double its bulk. Then proceed as in the above recipe.

WHOLE WHEAT BREAD.

Use whole wheat instead of white flour, or use half white and half whole wheat flour.

CINNAMON ROLLS.

Add to a soft, white dough ¼ c. butter, 1 egg and ½ c. sugar. Roll out ¼ inch thick; spread with butter, cinnamon and brown sugar. Roll and cut like a jelly cake. Put in pans.

When risen, put butter, cinnamon and sugar on them and bake in a hot oven.

VELVET ROLLS.

1 pt. milk, scalded, 2 tbsp, sugar, 2 tbsp. butter, 1 tsp. salt, about 1 qt. flour, ¼ yeast cake.

Dissolve the yeast in ¼ c. lukewarm water. Stir sugar, butter and salt into the hot milk and pour it into a bowl. When lukewarm add the yeast also the flour, stirring and beating well. Let it rise over night and in the morning beat down again. Never knead it. When it has risen the second time roll it out on a floured board, cut in rounds, butter each half circle and fold over. Let the rolls rise in a pan until very light and bake in a hot oven from 20 to 30 minutes.

DISCUSSION.

Answers by Miss McDermott.

Q. Is that always a test of the sufficient lightness of dough?

A. Yes, if it is risen enough it will fall when you touch it.

Q. How do you add the sugar?

A. In making this mixture I scald the milk first. The milk is put into the bowl, or whatever you are going to mix it in, then add the salt and sugar, and when it becomes lukewarm the yeast. It does not matter what kind of yeast you use, what brand you use. Good compressed yeast is always reliable.

Q. Would you use potato yeast?

A. Potato yeast is very good. The only thing to remember in handling yeast is that you do not freeze it or do not scald it to death; remember yeast is a plant, and give it the same care you would a plant in this way. A poor grade of flour may be improved by adding potato, *but not the potato water.*

Q. Is it necessary to grease the tin?

A. When I use a sheet of Russia iron or an inverted tin I do not grease it, but when I put the rolls in a pan I usually rub it over with a little grease.

Q. Do the rolls need to be kept warmer than bread?

A. No; only because if they are quite warm they will rise more quickly.

Q. Do you find any difference in using spring and winter flour?

A. Yes; for bread making I like a mixture of spring and winter flour, it makes a better bread.

Q. Which is the better to mix bread with, water or milk?

A. Water makes a sweeter bread and milk a richer bread.

Q. How long is it necessary to knead bread?

A. It depends on the condition of the bread. I knead it until it comes back into place quickly when I touch it.

Q. Do you make light graham bread in the same way you do white bread?

A. Literally speaking I do; usually I put a little more sugar in the graham bread.

Q. Do you make a sponge for the graham the same as the other?

A. Usually graham is made in the same way as white bread.

Q. Is the entire wheat flour as palatable as the graham?

A. To me it is much more so.

Q. Why do you put the sugar in before you whip the cream?

A. Because it is much less likely to taste buttery. Then, too, we should not beat the cream any longer than just to make it stiff, and if we do not put the sugar in until the cream is stiff we are likely to stir it too much when mixing in the sugar.

Q. Should gelatine be covered when it is cooling?

A. No.

Q. How would you cook meat if you were going to cook it in water?

A. If you have a piece of beef we will say that you want to eat for dinner, and your attention is on the meat, and not the liquid it is cooked

in, plunge that meat into boiling water and allow it to cook well. It should not boil all the time, however, and after it has boiled a while put it where it will only simmer and it will be more digestible. The salt should be added about half an hour before you take it out. In making soup put it in cold water and put salt in with it at the time and allow it to simmer, not boil.

Q. Is it better to boil meat or roast it in the oven?

A. I would never boil a piece of meat that I could roast, but you can buy so much cheaper meat to boil that it is economy to do so. I would never boil a good piece, but if it was a piece of the neck I would certainly boil it.

Q. Do you put water on meat when you bake it?

A. I never put water on a roast, but put in a piece of fat or suet.

Q. Do you pour boiling water over a roast before you put it in the oven?

A. I sear it over with fat if there is not already enough with it; if there is I just sift flour over the meat and put it in the hot oven.

Q. Would you feed cornstarch to a young child?

A. I would say most emphatically no. A child is not capable of digesting starch in any form; that is a child that is less than four or five months old.

Q. How should apples be served?

A. They can be served in so many different ways I don't believe I could answer that in the time given me. A good way is to bake them; you can serve them plain; you can serve them with cream and sugar and have a dish fit for a queen. Another thing is to put fresh apples on your table. In the city a family will often pay twenty cents for apples enough for one meal, while a farmer will let them rot in his cellar. Have apples on your table every day.

Q. How would you serve eggs for Easter?

A. I could write a book almost on this. One way would be to chip the end of the egg off, and let the egg run out; then take a warm gelatine and fill the egg shell, let this cool in the shell, when it will take the form of an egg, and then serve it with cream.

Q. Do you consider hot bread healthful for morning meals?

A. Hot rolls and hot buns are not nearly so bad as hot bread because they are more fully cooked than bread can possibly be.

Q. Do you think it is possible to put enough salt in our yeast to kill it?

A. If you put too much it certainly will do so, and you should add a little sugar.

Q. How can the farmer's wife be relieved of some of the drudgery of farm life?

A. Nothing upon the farm should be drudgery, and nothing is drudgery provided we are doing our work in the right spirit. The cleaning, the sweeping, the setting of the table or the washing of the dishes all may be made realy beautiful. The thoughts within make our work ignoble or glorious.

POULTRY RAISING FOR THE FARMER'S WIFE.

MRS. MARY A. MAYO, BATTLE CREEK.

How the farmer's wife may make money from her poultry is the question we wish to talk about and discuss today. The egg crop in the United States brings in more money than the wheat crop; and when we think that this egg crop has been largely supervised and managed by the farmers' wives of this country, we can in a measure realize that they have had an eye for business and have been busy women.

No woman ought to attempt the raising of poultry unless she likes fowls. For the money invested, with proper care and attention, I believe fowls pay the best of any stock on the farm. I can take thirty good hens and with less work and worry I can make more from them than from a first-class dairy cow.

Toward the latter part of August, when the hens have nearly ceased laying, I begin to give them extra care and attention. I am anxious they should get through moulting as early as possible. This moulting makes a greater drain upon the fowls than egg production, and they must have extra care in order that they may get ready as soon as possible for business in the winter when eggs bring a better price.

With a fairly good hen house, properly prepared food and cleanliness, there is no reason why fowls should not lay in the winter season.

In marketing eggs never put a soiled or a small egg in your basket. Sort them, using the small ones at home; you can use more, so it really makes no difference to you, but it does make a difference to your customers. Have private customers for your eggs as you do for your butter.

Another reason for the production of winter eggs is that you need to get your hens ready to set as early in the spring as you can. You need to know your hens individually and to talk to them, then they will talk back, sing for you and lay for you.

CROWD YOUR YOUNG CHICKS

as fast as you can, and as soon as they will weigh a pound and a half or two pounds put them on the market. I have private customers who pay me the highest market price. I dress them perfectly clean. When they are ready for the market there is not the fraction of an ounce of waste. They are cooled on ice, and go to market on ice.

I have found that the market demands a yellow skinned fowl, and as the Plymouth Rock seems to meet that demand I raise that breed.

The hen has been abused. Some people think if they have any mouldy corn or poor grain, that will do to feed the fowls. They frequently suffer from thirst, from exposure to draughts, cold and filthy quarters. Not infrequently are they infested with vermin and disease, yet dispite all this biddy lays fresh eggs for us and makes a pot pie fit for an epicure.

They should have good clean food and a clean place to eat it, plenty of clean water, and in winter a nice warm breakfast, with whole grain at night, and if it is very cold warm the late afternoon feed. When the snow is deep and the thermometer down to zero keep them in their feeding room with plenty of litter so that they may have to scratch for their grain. If corn is fed do not shell it, but with a hatchet chop the ears three or four times. Your hens must have exercise; if you find one sitting about, as lazy as she can live, you may rest assured that she is very unprofitable.

DISCUSSION.

Answers by Mrs. Mayo.

Q. What do you do when chickens have the roup?

A. I never had a chicken that had the roup.

Voice: It is best to kill them as they cannot be entirely cured.

Voice: In the first stages of the roup it will help them to burn sulphur and tar where they are, but it is not well to breed from those as it seems to be transmitted.

Q. What do you feed little chickens first?

A. Rolled oats.

Q. How do you get them to eat?

A. I have no trouble about that.

Q. What do you feed them in the morning?

A. Bran, corn and oats ground.

Q. What amount should be fed to a hundred fowls?

A. I do not have so many as that; I feed about a quart and a half to twenty-five hens.

Q. Do you think broken dishes good for hens?

A. Yes, and burned glass pounded up also.

Q. Do you feed them boiled vegetables?

A. Oh, yes; boiled beets, boiled turnips, boiled cabbage; boil them and salt them a little.

Q. Have you ever used green bone?

A. No; I don't believe I could grind the bone myself. I burn bones and pound them up and feed them.

Q. Do you think raw bone is better than burnt bone?

A. Yes, because you get only the mineral matter in the burned bone.

Q. At what age does a hen cease to be useful?

A. I would not keep them much over two years. If you have two or three that are especially good mothers, it is well to keep these for setting, but not for laying.

Q. Have you any trouble with the hen eating eggs?

A. Yes, and she comes to the block and goes to the pot just as soon as possible.

Q. What kind of fowls do you like best?

A. I raise the Plymouth Rock; I find they are yellow skinned and as I am raising for the market I like this kind best.

Q. Did you ever raise turkeys?

A. Yes, and I found it very profitable to myself, but very unprofitable to my neighbors, so I quit the business.

Q. Do you ever turn your fowls out when the ground is covered with snow?

A. No; in winter my hens don't go out at all when there is snow on the ground; they have a comfortable house and I keep them in it. On a day that you do not turn your horses and cows out keep your hens in.

Q. What do you consider the best feed for young turkeys?

A. Curd; Dutch cheese, and it is good for chickens also, but you should take the whey away from it. Squeeze the curd dry before it is fed.

WHAT WE FARMERS' WIVES NEED.

MRS. MATTIE A. KENNEDY, SLOCUMS.

Perhaps you will think my egotism unbounded and that I feel capable of compassing all needs, and settling the question for all our class, and for all time. Far from it, I may not be able to present to you any new thoughts, or old ones in new ways, but, if by repetition, remonstrance, and earnestness, I am able to help some *one* to see more clearly into the future I shall feel myself amply repaid for my effort. Remembering that each individual has a mind and a way of her own, if you cannot accept my conclusions, concede this much, that I cannot think with any one else's thoughts, nor see with any one's eyes but my own.

Our needs are so many. Where can you find the home, the spot, the place, the mind that has not some pressing need? Where can one find the farmer's wife and family who are living in content, and have all their needs supplied? Each has a different standard by which they measure their absolute necessities, and what might mean satisfaction to one would be valueless to another.

One thing we need is more

LABOR SAVING MACHINERY

in the house. The average farmer has in his possession a machine for saving his strength for almost every kind of work he has to do. The various contrivances for planting, cultivating, and harvesting crops are almost endless, while the minor details of work are well supplied. Go through the houses where an abundance of these things is owned and the paucity of helps will startle you. If the average housekeeper is supplied with a sewing machine, washing machine, and a clothes wringer, she is considered to be possessed beyond her just deserts.

Not many farmers who own or rent forty acres of land but have a mowing machine in use not to exceed ten days in the year at a probable cost of $25.00. In how many homes will you find a carpet sweeper in use three hundred and sixty-five days in a year at a maximum cost of $3.00? Carpet sweeping is one of the hardest labors we have to perform, yet the mowing machine is considered a necessity and the carpet sweeper a luxury. A grain drill that will cost from $25.00 to $50.00 and not exceed

twenty-five days' use in a year is hailed as one of the grandest labor saving devices a man can possess, but looking through the homes where these are owned, in how many will you find an ironing table, in use at least fifty-two days in a year, and costing $2.50? One could find a long list of comparisons were they needed.

AND WHO IS TO BLAME?

Our husbands are not altogether to blame for this state of things. It is due as much to our own inactivity and want of firmness. There is no necessity for our nagging and whining over the fact that we are insufficiently provided for. But quietly and firmly, in your own sweet way, insist upon having such helps as you need in your work. Your husband knows very well when he is working beyond what he can stand, and finds a way to provide for the necessary help. When you are wearing your body beyond your physical strength you are doing a criminal act. When I hear a woman boasting that "she worked all day when she could hardly stand," I feel like shaking her and shaking some horse sense into her. It is a crime against her husband, herself, her children unborn, and her Maker, and there should be a law prohibiting it with a penalty attached for its transgression.

I do not think that all emergencies can be provided against. Such extras as unexpected company when you are five miles from a store and out of sugar, sickness, battle, murder, and sudden death, these have to be met some how or the other how (generally the other how) and lived through with what fortitude we can summon. But when it is over with, rest, even if the family have to live on faith and cold tea for a week.

One crying need is an escape from ruffles. I do not believe any woman or household was ever made better or happier for having anything they wore, sat on, or slept on ruffled. No family can spend a happy evening together whose wife and mother is tired out physically and mentally; is peevish, nervous and generally disagreeable from standing on her feet for hours doing up those ruffles. No child ever grew faster or smarter from having its every day garments covered with frills and fritters. No sleep was ever sweeter for the head resting on ruffled pillow slips. No limbs ever tramped the sturdier on errands of love, mercy, or charity for being incased in ruffled garments. But many a dear little woman has grown old, tired, wrinkled, gray, and finally laid down her flat irons and died of—*ruffles*. One need that impresses me at every turn is

EMANCIPATION FROM THE MOULDING BOARD.

When the Puritan housewife had unexpected company to dinner or supper she did not spend her entire time preparing a feast. She simply boiled a little more mush and put on another wooden trencher. Could she have lived today and seen the variety required by the average farmers and laborers she would wonder where they got the time to cook it, or the strength to digest it. I am a lover of good food myself—but few people are not. But because I like it is no reason why I should have

some of each kind for each meal. Because we have been so prodigal with our eatables we have tired of the good things we have had and are constantly striving after new combinations and more of them until the major part of a woman's life is spent at the moulding board constructing new designs in pie, cake, or pudding, and over the dish pan in cleaning up the mess, while the family have forgotten that we eat to live, and simply live to eat. Have of the substantials an abundance, of cakes and rich puddings a limited supply; and I hope the day will come when pie will be banished from the bill of fare.

One of our greatest needs is a

BETTER CLASS OF LITERATURE

in the farmers' homes. The amount of insignificant slush printed in the household columns of the ordinary newspaper would lead a person who did not know better to believe that the ordinary farmer's wife did not have brains enough to understand the balance of the reading matter and such stuff must be printed for her benefit. The greater share of it would answer to ornament the recreation room of an institution for the feeble minded. It is an insult to the farmers' wives as a class and womanhood in general to print such trash and label it "Woman's Department." The same may be said of most of the cheap magazines.

Now, we read for several results, for rest, recreation, amusement, knowledge, or to grow better. How are we going to reach either with the class of literature generally supposed to be suitable to womankind? Now, my sisters, have good books, good papers and good magazines for the cultivation and recreation of your minds, if you have to leave out the pie from your bill of fare for the next year to pay for it. Don't vegetate in an atmosphere of cake receipts and crotchet lace samples, but read discuss and reflect upon the politics of your newspaper, if there is nothing better in it. Take some good magazine and leave out some of the puddings that you may have time to read and enjoy them. People will not know ten years from now whether you had pudding for dinner or not, but they will know whether you have any brains and know how to use them. The products of our best authors may be purchased today in paper covers from ten to fifty cents per volume. There is no excuse for your spending your time on magazines and novels of the "Dead-Eye-Dick" sort, when so much that is of the best may be purchased for so little.

Last mentioned, but not least to be considered, is a need to stop fretting. Why do we do it? And what do we gain by it? We make ourselves and everybody around us miserable and discontented, and are neither health or dollars ahead. When we have raised a very respectable fever, and gained a few caustic remarks from the head of the house, we are left alone to be miserable over something that in our inmost selves we are ashamed of. Dear sisters, no good ever comes of it, and why not stop it? We each have our petty trials and duties distasteful to us and none can gauge the depths of another's misery by their own.

Take the world as it comes to you, use the good to the very best advantage and let the ills slip off like water from a duck's back, and while realizing the discomforts of the mist and clouds determine still to be happy and doubly enjoy the sunshine.

DISCUSSION.

MRS. STILES KENNEDY, ST. LOUIS.

Mrs. Kennedy, in her paper, has pointed out to us the many needs of a farmer's wife, but to me the part relating to good literature is the most important part. How many poor, over-burdened mothers we see who are sacrificing their lives for perhaps the object of hoarding up a little money, or to please an exacting husband. There should be more of a desire in the farming districts for good literature. But some will persist that they have no time for study, reading or recreation; is not your mind more valuable to you than money? Statistics show that nine-tenths of the inmates of our insane asylums are from the country; do you think that if our country women did a little less work, and worried less that this would be true?

Mrs. Mayo: Another thing I think should be done is the breaking down of an imaginary wall between the country and city people; and I think that the farmers' wives are a little more than half to blame. If we would come half way our city cousins would be willing to come the other half. We country women need the help of the city women, and the city women need the farmers' wives with their independent spirit and good judgment.

Mrs. Stiles Kennedy: I think Mrs. Mayo is just right about this wall between country and town people, and I do think as Mrs. Mayo says that you country people are in fault a good deal. We are all so delighted to see the country people, and would like to know them better; we are willing to go more than half way if you will come that part.

I do not know as it is an astounding statement that nine-tenths of the inmates of our insane asylums come from the country; but on the other hand do you know that nine-tenths of the men and women who made this country great came from the farm? You see I am taking the other side of the question. This subject of good literature I think is a very interesting one; we should read more. I wish we as mothers would read more of the books that our children are reading. Mrs. Kennedy touched on so many things we need to do; one of them was "don't worry;" we don't worry very much do we? Isn't it strange that we allow these little things to come in to worry about, and do not see the beautiful things about us? But I think just such meetings as this; just such Farmers' Institutes, will help to, well, I might say, keep us out of the insane asylum.

Mrs. K. L. Butterfield: While speaking of farmers' wives reading good literature the thought comes to me that another important question is the social life of the farmers' wives. It seems to me that we ought to meet people and have something to talk about that is elevating. There is nothing that draws us out of ourselves so much as meeting people who know something we do not know; it gives us something new to think about and to bring home to our families.

MOTHER AND DAUGHTER.

Mrs. Mayo's talk on this subject was practically as given at Grand Rapids and will be found on page 231 of the Institute Bulletin for 1896.

DISCUSSION.

Mrs. ————: I think, as Mrs. Mayo says, that if a mother has not the confidence of her daughter it is her own fault.

I can only speak from my own experience, but I can say if one does lose this confidence, by earnest persistency they can regain it again; at least this has been my experience. Through sickness for years my daughter was left to others, and this confidence was broken, but I am thankful to our Maker above that through his help, I know it could not have come about any other way, that confidence has been restored.

I thoroughly endorse every word that Mrs. Mayo has said; I not only endorse it but I try to practice it. In my own home with my daughters and my sons I hope, and I think I have, their full confidence. I am going to tell you the secret; I am never going to grow up so old but that my children's amusements are amusements to me, and I hope I may never grow too old to enjoy them.

Q. To whom shall I give the daintiest room; my daughter or my son?

Mrs. Mayo: Give the boy the best. If I had two good ones would make them the same, but if one is the best it should be given to the boy. The girl with her mother's help can make hers dainty, and girls like to do this. A boy has more temptations than a girl and needs all the refining influence you can give him. But, somebody says, boys do not like their rooms *fixed up*; let me tell you in this you are mistaken; they like them just as dainty as a girl does.

Q. Should a boy be allowed to lock his room with his belongings in it so that no one can get in his room?

Mrs. Mayo: It is well enough to let a boy have his room so it can be locked if he wants to do so, but it should always be understood that mother can go to that room whenever she wants to. Boys have so many things that they do not want *bothered* with, especially by the younger children, as they are often likely to spoil them. Boys, I think, are inclined to be touchy about this, and still I do not know as I can blame them. But children should be taught to respect each other's things. If they learn to respect each other's things when they are children they will respect other people's rights when they are older. One great trouble in the world is that people do not respect the rights of others and mind their own business, and we should teach children to regard their own business and not bother other people's affairs.

Q. Shall a boy or girl be allowed to decorate his or her own room to suit themselves?

Mrs. Mayo: It seems to me that this is one way in which we cultivate the tastes of our children is in helping them to decorate them. Some one says if we let them decorate them themselves there will be more originality about them; probably this is true, but that originality sometimes needs to be cultivated, and we can cultivate these tastes in this way, by helping them to decorate them in a tasteful manner.

LECTURES AT LONG FRUIT INSTITUTE.

BY DR. R. C. KEDZIE, AGRICULTURAL COLLEGE.

The following series of lectures was given by Dr. Kedzie at the Long Fruit Institute at Shelby, Oceana county, December 15-18, 1896. The full program will be found elsewhere in the report.

FORECASTS OF FROSTS.

People express surprise that the tops of mountains even in the torrid zone and at midsummer are covered with snow. "When we climb the mountain at noon we are getting nearer the sun, the source of heat, yet it grows colder the higher we go!" Here comes in the wonderful blanketing influence of the atmosphere to catch and hold the sun's heat. No shawl of human devising has such lightness and heat-retaining power as the atmosphere which covers the earth a hundred miles deep and yet *"as light as air."* No covering of eastern loom can for a moment compare in all these qualities with this wonderful blanket of air which lets in the light and heat of the sun and shuts out the cold. The interstellar space beyond our atmosphere, though traversed by the sun's rays, is cold beyond our comprehension and dark as midnight. But for this blanket of air we should freeze every night of the year.

But if the sun's heat can so freely penetrate this vast envelope of air to warm the earth, why cannot it as readily escape into space and leave us as cold as before? Heat when associated with sunlight can freely pass through transparent substances without heating them very much. I hold a burning glass by which the sun's rays may be brought to a focus and combustible substances set on fire, while the glass remains cool. Some gentlemen in Washington, a few years ago, made a lens of ice two feet in diameter by which the sun's rays were brought to a focus with heat enough to melt gold, yet the ice did not melt. But when heat is dissociated from sunlight it loses to a large degree this power to pass through transparent substances; hence the heat in a glass house when the sun shines, the glass is not heated by sunlight passing

in, but prevents it from going out when the heat is radiated from the ground and plants. The atmosphere like a vast glass house encloses the whole earth and keeps it warm in the same way as the greenhouse.

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BUT IT IS THE VAPOR OF WATER

that has most to do in retaining this non-luminous heat. This is especially noticeable at night when the earth is not receiving the sun's heat, but is parting with it by radiation. When the air is very dry the temperature falls rapidly after sunset, and the nights are cold. When the air is very moist, the nights are hot in summer. You have all observed that in a dry spell, when the sky is clear of clouds, the temperature falls greatly by night; but if the air is moist and sky overcast, there is but little fall of temperature. Very dry countries always have cold nights. Jacob of old discovered this on the dry plains of Syria, "In the day the drought consumed me and the frost by night, so that sleep departed from my eyes."

With moist air there is little danger of untimely frost, but danger comes in with drought. Watery vapor in the air arrests dark heat and prevents large fall of temperature at night; it is an extra blanket at night to keep the earth warm. The angel of water keeps watch and ward over every living thing.

The capacity of water to hold heat exceeds that of any known liquid or solid. A jug of hot water is a better foot-warmer than a stone heated scorching hot. It is the slowest to heat and slowest to cool of any known substance. This explains why the climate near large bodies of water is so uniform. It is the conservation of heat by the water of Lake Michigan that gives us the peach belt.

IT TAKES MORE HEAT

to change water into vapor than any other material. If an ounce of water is changed into steam and this steam condensed in 967 ounces of water it will raise the temperature of the whole mass one degree F. It takes 967 degrees F. of temperature to vaporize water, and the same amount of heat is given out in condensing the steam. Vapor of water at any temperature when condensed into liquid gives out 967 degrees of heat, or enough to raise 967 times the weight of water condensed through 1 degree F.

The air always contains vapor of water. If it holds all the watery vapor it can sustain at a given temperature, the air is saturated, or at the temperature of dew point, for if there is a further reduction of temperature, water will be deposited and dew formed—dew, if the temperature is above frost point, or hoar frost if the temperature is below frost point.

When the temperature of the air is much above dew point, the open air thermometer may fall continuously as night comes on till dew point is reached, where there is a marked change in the process; the brakes are applied against further fall of temperature, because dew begins to be

deposited, the latent heat of watery vapor is given out, and further fall of temperature is singularly retarded. This heating by condensation of watery vapor is a most conservative process in nature. Water is the balance wheel of temperature, taking up a vast amount of heat in evaporation and giving out in time of need the same amount of heat in condensing, screening us from consuming heat, and saving us from deadly cold.

When the air cools down to dew point, the temperature will skirmish around dew point, the deposition of dew liberating heat and warming the air; if temperature falls farther, more dew and more heat is set free. More heat is due with more dew.

NOTE THE WONDERFUL RELATION

of water to the preservation of terrestrial temperature: when heat is abundant, water is evaporated and heat is stored up for time of need; this vapor not only holds heat, but retards loss of heat by radiation; if there is danger of frost, watery vapor is condensed and the latent heat given out, warming earth and air, and thus the debt of cold is *liquidated*. It is in dry weather when the soil and air are deficient of moisture and rain is lacking that there is special danger of untimely frosts. A good rain changes the conditions wonderfully.

KILLING FROST.

It is a matter of great importance to the farmer and fruitgrower to have warning of the approach of killing frost at critical periods in the growth of crops. The periods of special danger may be divided into two classes.

1st. *Cold waves.*—When vast bodies of cold air out-flowing from areas of high barometer in the west bear down upon us from the frozen plains of the northwest, or the cold northwest winds that follow in the wake of our great storms.

For the prediction of the cold waves we must rely upon the weather bureau, which has done so much to guard property and persons by timely warning.

2d. *Radiation frosts.*—Caused by local conditions, quite unlike the frosts caused by storms sweeping over the country. The winds are asleep, the air is dry, the sky is clear at night, it is hot in the sunshine and chilly in the shade, "there is frost in the air," the shadows are deep, and the air is clear and bright. These windless, cloudless nights are times of special danger from frost; greater in valleys and sunken places than on highland, because the cold and heavy air flows down into these low spots making a lake of cold air, and thus increasing the cold in such locality. If there is a wind at such times these lakes of cold air are broken up, and by mixing the air of different places the temperature is equalized and danger diminished. If the sky is cloudy, the clouds arrest the escape of radiant heat and reflect it back to the ground. The clear sky is an especial element of danger.

WHY WATER VAPOR IN THE AIR SHIELDS FROM FROST.

In two ways. 1. By retarding the escape of the day's heat by radiation by night—it blankets the cooling earth from the cold of inter-stellar space. 2. By bringing out the latent heat of vapor as sensible heat, or heat of temperature by condensing vapor into water. By finding how near the dew-point comes to frost-point we can determine how near danger lies.

Suppose the temperature of the air is 60 degrees F. and that of dew-point is 45 degrees F. The temperature may fall with little interruption till it reaches 45 degrees F. where a further fall will be interrupted by the precipitation of watery vapor into dew with liberation of heat as a consequence, and the further fall of temperature retarded thereby. The dew-point itself will be somewhat lowered by this precipitation of the watery vapor, but the temperature will fluctuate around the dew-point, and not fall much below it. If dew-point is twelve to fifteen degrees above frost point, there is very little danger of frost, but if dew-point is at or below frost-point, then the fall of temperature may go on unchecked till dew-point is reached, and the danger of frost is great.

The *temperature of dew-point* therefore affords a valuable means of *determining the danger of frost* at any time during the growing season. The method of finding the temperature of dew-point is simple, and the means not expensive. It takes only a short time, and any person with suitable apparatus and the use of the following table can make the determination in ten minutes.

THE SLING PSYCHROMETER.

This is a formidable name, but a simple instrument. It consists essentially of two thermometers, the bulb of one being left naked and kept dry, the bulb of the other being covered with a thin layer of cloth which is kept wet ("wet bulb") during the time of an observation. By placing these "dry bulb" and "wet bulb" thermometers side by side and comparing their readings we may determine the amount of cold produced by evaporation and thus measure the relative dryness of the air. If there is no evaporation the two thermometers will show the same temperature, but any evaporation will produce cold, and the more rapid the exaporation the greater the reduction of temperature. The dryer the air the more rapid the evaporation and the greater the cold caused by evaporation. The psychrometer, or the "wet and dry bulb thermometers," afford the means for determining the amount of moisture in the air, and the temperature of complete saturation or dew-point, by measuring the reduction of temperature by evaporation.

A sling psychrometer can easily be made as follows: For the frame take a board twelve inches long, two inches wide and one-half inch thick, with a hole bored in one end to hang the apparatus on a nail when not in use. Get two all-glass thermometers with cylindrical bulbs, and

the degrees Fahrenheit engraved on the stem.* Cover the bulb of one thermometer with a thin piece of cotton cloth, fastening it securely by a thread. When this cloth covering is wet with water and exposed to evaporation in the air, it constitutes the "wet bulb thermometer;" the other thermometer has no covering on its bulb, is not wet at any time, and constitutes the "dry bulb thermometer."

Securely lash the thermometers on opposite edges of the narrow board, leaving the graduations on them plainly in sight, and the bulbs extending a short distance below the end of the board. To use the instrument, wet the cloth covered bulb with water, leaving the other bulb dry, and then swing the apparatus freely through the air for three to five minutes, or until the wet bulb thermometer ceases to fall in temperature, and then read the temperature of each thermometer. Unless the air is saturated with moisture the wet bulb will always show a lower temperature than the dry bulb. Subtract the degrees of wet bulb from those of the dry bulb, and the remainder will show the degrees of cold produced by evaporation. Suppose the dry bulb marks 65 degrees F., and the wet bulb 56 degrees, then 65 degrees minus 56 degrees equals 9 degrees, or the cold produced by evaporation. This swinging and reading of the psychrometer are done in the shade in the open air when the temperature of dew-point is sought; it should be done rapidly and the thermometer read promptly. The dry bulb gives the temperature of the open air, and the dew-point is determined by the following table, taken from the meteorological tables of Professor Hazen, of the United States Weather Bureau. The range of temperature of the open air in this table is from 36 degrees F. to 75 degrees F., and of depression of temperature in the wet bulb, from 1 to 13 degrees F., giving a range in both directions of sufficient scope for the needs of Michigan farmers during the growing season. The temperature of the dry bulb (or open air temperature) is found in the left hand column of the table; the difference in degrees between the readings of the dry and wet bulb is entered in the horizontal line at the top, from 1 to 13 degrees. To find the temperature of dew-point at any observation, find in left hand column the temperature of dry bulb, then follow the horizontal line opposite that figure till you reach the perpendicular column under the difference between dry and wet bulb readings, and the figures at the meeting of these two columns will give the temperature of dew-point. For example, suppose the dry bulb stands at 65 and wet bulb at 55 degrees, the difference is 10 degrees. Pass across the page in the line of 65 degrees till you intersect the vertical column under 10 degrees and you read 47 degrees which is dew-point under these conditions.

If the temperature of dew-point is 10 degrees or more above frost-point (32 degrees F.), there is no danger of killing frost, but if the temperature of dew-point falls to 42 degrees F., danger may be apprehended. All dew-point temperatures which indicate danger of frost are printed in full-faced type.

*I have written to several dealers in instruments for terms for supplying our farmers with good thermometers for this use. The best terms are offered by Eimer & Amend, No. 205 Third avenue, New York, who sell 12-inch cylindrical thermometers for 35 cents each. For $1.75 they will mail a pair of such thermometers.

Table for determining the temperature of dew-point from the readings of the dry and wet-bulb thermometers.

Dry-bulb thermometer.	Depression of the wet-bulb thermometer.												
	1°.	2°.	3°.	4°.	5°.	6°.	7°.	8°.	9°.	10°.	11°.	12°.	13°.
75°	74	72	71	69	68	66	64	63	61	59	57	56	54
74°	73	71	70	68	67	65	63	61	60	58	56	54	52
73°	72	70	69	67	66	64	62	61	59	57	55	53	51
72°	71	69	68	66	64	63	61	59	58	56	54	52	50
71°	70	68	67	65	63	62	60	58	56	55	52	51	48
70°	69	67	66	64	62	61	59	57	55	53	51	59	47
69°	68	66	64	63	61	59	58	56	54	52	50	48	46
68°	67	65	63	62	60	58	57	55	53	51	49	46	44
67°	66	64	62	61	59	57	55	54	52	50	47	45	43
66°	64	63	61	60	58	56	54	42	50	48	46	44	42
65°	63	62	60	59	57	55	53	51	49	47	45	42	40
64°	62	61	59	57	56	54	52	50	48	46	43	41	39
63°	61	60	58	56	55	53	51	49	47	44	42	40	38
62°	60	59	57	55	53	52	50	48	45	43	41	39	37
61°	59	58	56	54	52	50	48	46	44	42	40	38	35
60°	58	57	55	53	51	49	47	45	43	41	39	36	33
59°	57	56	54	52	50	48	46	44	42	40	38	35	32
58°	56	55	53	51	49	47	45	42	41	39	36	33	30
57°	55	54	52	50	48	46	44	41	40	37	35	31	28
56°	54	53	51	49	47	44	42	40	39	36	33	30	26
55°	53	52	50	48	46	43	41	39	37	34	31	28	25
54°	52	50	48	46	44	42	40	38	36	33	30	27	23
53°	51	49	47	45	43	41	39	37	34	31	28	25	20
52°	50	48	46	44	42	40	38	36	33	30	27	23	18
51°	49	47	45	43	41	39	37	34	31	28	25	21	16
50°	48	46	44	42	40	39	37	33	30	27	23	19	14
49°	47	45	43	41	39	37	34	31	28	25	21	17	11
48°	46	44	42	40	38	36	33	30	27	23	19	14	9
47°	45	43	41	39	37	32	29	25	22	19	17	12	6
46°	44	42	40	38	36	33	30	27	24	20	15	10	3
45°	43	41	39	37	35	32	29	26	22	18	13	7	−1
44°	42	40	38	36	33	30	27	24	20	16	11	4	−5
43°	41	39	37	35	32	29	26	23	19	14	8	1	−9
42°	40	38	36	34	31	28	25	21	17	12	6	−2	−15
41°	39	37	35	33	29	26	23	19	15	9	3	−6	−22
40°	38	36	33	29	26	23	19	15	9	3	−6	−22	.....

This margin of 10 degrees is taken because the temperature on a still night may sink a few degrees below the first dew-point, and the temperature of the air at five feet above the ground is several degrees above that at ground level. For these reasons combined a margin of 10 degrees may be safely assumed as the limit of safety.

If the dew-point is at or above 42 degrees F. there is little danger of frost, but if it is as low as 40 degrees F., and especially if much below 40 degrees, the danger is greatly increased. A fairly accurate estimate of the danger for the following night may be made as early as 2 p. m., and thus time may be secured to ward off the danger in some degree.

REMEDIES.

1st. *Water, to moisten the soil and air*, thus to raise the temperature of dew-point, and also to arrest the loss of heat by terrestrial radiation. This may be done by spraying the plants with water, by stirring up the ground by the cultivator to expose moist earth to promote evaporation, or by irrigating the ground and securing fullest influence of water.

2d. *By fires*, not with the hope of warming the body of the air, as by forming a cloudy covering over the field to arrest the escape of radiant heat from the ground. A clear burning fire is not as good as a smudge to form a cloud over the field. In France they burn coal tar for this purpose. To save his fruit the orchardist may have to pass through fire and through water.

Every fruit-raiser should have three things:

1st. Psychrometer to tell him how near the temperature of the air is to frost point.

2d. An alarm clock to wake him at 1 a. m. to read the psychrometer.

3d. A supply of water for spraying when required.

THE SIMPLER CHEMISTRY OF THE SOIL.

Innumerable are the forms of matter—too many for our counting. Yet the chemist tells us that some seventy kinds of elementary matter, by their various combinations, make up the earth and all that goes with it.

The soil is the physical basis of life; the home of the plant and the resting place of the animal. In coöperation with air and water, under favorable physical conditions, all forms of life come into being, and perform the brief drama of existence with the earth as a stage.

The soil is pulverized rock, and is formed directly or indirectly from the breaking down of rocks. Compared with the mass of the earth the soil is only a sprinkling of dust on its surface, like the bloom of a plum.

The mass of soils is made up of silica (sand), alumina (basis of clay), and lime. With the addition of magnesia and oxide of iron we have the mechanical elements of the soil that give support to the plant and relate it to heat and moisture so as to make vegetable growth possible. This list leaves out of account a number of materials most important to vegetable life, the alkalies and the substances that give special significance to most forms of life, *e. g.*, sulphur and phosphorus.

OF THE SEVENTY ELEMENTARY SUBSTANCES,

only thirteen are found in farm crops. The great bulk of all animal and vegetable substances is made up of carbon, oxygen, hydrogen and nitrogen—usually 95 to 99 per cent of the organic material—and these are the materials which pass off as invisible gases when such materials are burned. The material which remains and forms the ash contains nine substances, potash, soda, lime, magnesia, and oxide of iron, and four non-metals, chlorine, phosphorus, sulphur and silicon. Out of this baker's dozen all farm products are formed. These nine mineral substances come entirely from the soil, and all fertile soils contain them.

A glance at the tables of analyses of Michigan soil shows that they all contain the minerals of agriculture, but in varying amounts.

Soils may be divided into three classes.

1st. *Inert and insoluble matter*, consisting mostly of sand and clay, and forming much the largest part of all our soils. These have a mechanical office, giving firmness and texture to our soil, enabling it to hold water, hold heat and sustain the plant during life.

2d. *Reserve materials*, which for the time are insoluble and inactive, but may become available by the plant by reason of chemical changes.

3d. *Active elements of plant-growth*, which can enter the roots of plants in solution in soil water, or made soluble by the acid action of their roots; they thus enter the plant and circulate in its sap, and in some unknown way preside over the vital processes concerned in plant-growth. They constitute a small part of the soil, usually less than one part in a hundred.

If these materials are so soluble, is there not danger that they may escape in drainage water and thus be lost to the farm? Not necessarily. A soil permeable by water is not of necessity a leachy soil. Here is some glass-blower's sand, nearly pure silica, and therefore a leachy soil. I fill the glass funnel with this sand and filter a dilute solution of potash through it, letting the water drop into a solution of phenolphthalien, and a few drops makes a deep red color, showing that the potash was not retained by the soil. I try the same experiment with some soil from Mr. Petersen's garden and you see that no potash comes through. I try a similar experiment with phosphate of soda, and you see the phosphate is not retained by the sand, but is held by the garden soil. A similar experiment with ammonia shows corresponding results with the sand and with garden soil. You thus see that a porous soil may still retain certain materials and prevent their washing away in drainage water, and may even take them out of solution and fix them in the soil. It is the fine dust, the impalpable matter of soils, the clay, oxide of iron and humus that possesses this fixing power.

OF THE MINERAL ELEMENTS OF THE SOIL,

not only is there a large variation in the amount of the several materials, but the plant makes very unequal demands for these materials. The three substances in large demand by plants and absolutely necessary for their growth are potash, phosphoric acid and lime, and these must be present in every fertile soil. Let us examine some of your Shelby soils for lime and see if this necessary material is present. For comparison I will use Mr. Petersen's garden soil and some soil from "the stump lands" near by which a gentleman has brought for this purpose. The two soils are placed in two glass funnels and a quantity of dilute hydrochloric acid filtered through which will dissolve any lime present in the soil. Here are the two filtrates made under identical conditions. I apply to each a solution of oxalate of ammonia, which will precipitate the lime in the form of white oxalate of lime. The garden soil affords a heavy precipitate of oxalate of lime, while "the stump land" gives a very small precipitate. This gives one reason why "the stump land" will not produce good crops. By a similar process I test these two soils for phosphoric acid, and in the abundant yellow precipitate caused by the molybdate of ammonia from the garden soil you see evidence of the ability of the garden soil to bear crops, while the scanty precipitate from "the stump land" indicates its feeble productive power.

THE NATURAL SUPPLY OF POTASH

in the soil comes from the decomposition of rocks containing silicate of potash—notably from feldspar, the double silicate of potash and alumina. Here is a fragment of feldspar which contains one-sixth of its weight of potash. This rock in decomposing to form clay gives up about seven-eighths of its potash and retains one-eighth. Let us esti-

mate how much potash to the acre would be set free by this breaking down of feldspar to form clay. Suppose we have soil materials or rocks which hold only ten per cent of feldspar, how many pounds of potash per acre would be given up, taking the soil one foot deep? Fifty-five thousand four hundred and forty pounds. But figures give us only a hazy conception after all. Let us measure this potash by some crop that requires a large amount of potash. Three tons of clover hay contain 105 pounds of potash. Suppose some enterprising Indian farmer had discovered the value of red clover ages ago and begun raising on such a field of feldspar three ton crops of clover 125 years before Columbus discovered America, and his descendants had kept on cropping at the same rate, the surplus potash would just be used up now.

The clay left by this process would still hold 11,200 pounds of potash. This suggests a reason why the boulder clays of our State have such persistent fertility if properly managed.

The case of potash in feldspar, a material in great demand but not in the active condition, but capable of being made active by chemical changes in the soil, is a good illustration of

THE RESERVE MATERIALS

in the soil. It is by promoting the changes which convert the reserve into active materials that some of the best results in farming are secured. The farmer who has a reserve store of potash in the soil and makes no effort to draft it into active service, but rushes off to Germany to hire some Hessian substitute in the form of Stassfurth salts, will hardly win the battle on the farm. Call out the reserves by the action of frost, weathering, the decomposition of organic matter in the soil, green manuring, etc.

The soil is not an inert and changeless mass, but is the seat of constant changes and ceaseless chemical activities. Most of the operations of tillage indirectly promote these changes. The plowing, harrowing and cultivation do something more than destroying weeds and mellowing the soil. They aid in calling out the reserves and bringing into active service materials which would otherwise remain useless, and for which the crops may languish. Again I say *call out the reserves!*

SOIL EXHAUSTION.

This is a term often used for a condition of the soil caused by injudicious or excessive cropping. It is often described by the expression, "the field is run down" or "out of condition." It does not mean that nothing will grow—that would be a barren, not an exhausted, field. No soil by mere cropping is brought to such a condition that nothing will grow, but if its productive power is so reduced that it will not produce a crop at a profit, it is an exhausted soil. Profit above cost is the demand of the American farmer. A margin of profit beyond the rent of the ground and expense of cultivation is necessary for continued cultivation. The worn out tobacco lands of Virginia are a notable example of exhausted soils.

SOIL EXHAUSTION MAY BE CAUSED

by two conditions of the soil:

1st. By a bad physical state; soil may be too light and porous to secure good results, or it may be too heavy and compact, cloddy and impervious by the roots of plants, and excluding air from freely entering the soil; or it may be water-logged from want of drainage. With these physical defects the chemist has nothing to do, and it is for the farmer to correct and remove such evils.

2d. The soil may be exhausted from chemical causes by reason of a deficiency of available plant food in the soil. This deficiency may be caused by a limited supply of some material essential for the growth of the plant. Usually it is from too small a supply of one or more of four substances, viz.: potash, phosphoric acid, active nitrogen, and lime. In case of a relative deficiency of any one of these four, the other elements of plant growth are correspondingly limited.

THE SOIL IS NOT A MINE,

to be worked out and abandoned. It is rather a workshop in which to make and elaborate the food and comfort for the race and for all time. The farmer who seeks to work out his farm, leaving nothing for the future, is the robber of the race unborn. The farm is the heritage of the race.

The farmer sometimes speaks of his land as being tired. "This field has been under crop for many years, and I will lay it down to grass and let it rest." The language is suggestive of rest in one's bed, and we might almost expect the grateful field to exclaim with Sancho Panza, "Blessed be the man that invented sleep." But the forces of nature do not tire and grow weary. Gravitation never forgets to pull an unsupported body to the ground; the chemical forces never forget their work and play "hide and seek" with duty. Animate nature alone grows

weary, and gains strength by repose. But the elementary forces are clothed with immortal youth and are ever ready for their task. The period of rest for a field is merely the time when the reserve forces are brought out more rapidly than they are used up by growing crops. A summer fallow is a fair example. A field laid down to grass accumulates more carbon from the air than is removed in the crop of hay, and when the sward is plowed under there is a large accumulation of humus.

One of the most significant of the chemical causes of infertility is the want of an adequate

SUPPLY OF ACTIVE NITROGEN

for the growing plant. We think of the soil mainly as the source of mineral food for the plant, and so it is; but it is equally as important as a source of available nitrogen for the wants of the plant. The growing plant finds its chief supply of nitrogen in the soil. In nine cases out of ten the first condition of soil exhaustion is this deficiency of active nitrogen found in the form of ammonia, nitrates and organic nitrogen of manures. Nitrogen is absolutely indispensable for the growth of plants and a limited supply of this material limits all the other chemicals of growth. In ordinary cropping it is the material soonest exhausted, and hence becomes the most frequent cause of soil exhaustion.

Liebig classed nitrogen among the air-foods of plants, because the nitrogen as well as the carbon, oxygen and hydrogen of vegetable matter escapes into the air in the form of invisible gases when burned. He compared the animal system to a living furnace in which the food is burned and the ashes, or mineral matter, reappear in the animal excretions. In fact he compares animal excrements to the ashes of food burned in the body. But food is not burned in any such sense, the nitrogen of food does not escape into the air when passing through the animal system, but all reappears in the excrement. Food is not destroyed absolutely, but the nitrogen and mineral matter reappear as a frame work to be reclothed by the vegetable life for new uses by the animal. The animal system may rather be compared to a paring machine to peel off the hydrocarbons (or true air food) and leave the frame to be rehabilitated for new service.

The atmosphere supplies some combined nitrogen in the form of ammonia and nitrates—an average of 8¾ pounds yearly—an amount insufficient for the supply of any crop. These are brought down in the rain and snow. The great reservoir of nitrogen is the air; but this nitrogen is free and uncombined, and, with the exception of the leguminous crops, is unavailable for crops. The great supply of available nitrogen is to be found in the soil. How to secure a supply of this precious material is a matter of great importance to the farmer.

FEEDING THE SOIL.

The farmer's bank is the bank of earth. Like other banks, it can only pay out what it holds or discount its deposits. If there is a run on this bank and it becomes insolvent of plant food, no amount of importunity of plant or planter can call forth an issue of current funds.

Dropping figurative language, we may say that we feed the soil when we add to it any material which may directly or indirectly furnish plant food, or when we bring into active form the reserve materials in the soil.

BARN YARD MANURE.

The first method embraces manuring of every kind, and foremost in this class is farm yard manure. I need not tell you of its importance and the need of saving it all for use in the soil. It is the pivot of successful farming—the natural and cheap product of the farm, yet of great value.

To this must be added every waste animal substance, no matter how repulsive or offensive. The rotting and stinking material is a sweet morsel for the plant. Many materials that at house cleaning find their way to the fire heap, filling the neighborhood with the odor of burning feathers, should rather be consigned to the compost heap to form valuable manure. Worn out leather, woolens, feathers, bones, etc., may all be made available and useful by composting with wood ashes. Any material that will furnish a supply of combined nitrogen to the soil should not be wasted.

So, also, the

GROWING OF MANURAL CROPS

Of clover, peas, etc., which accumulate nitrogen, and when plowed under enrich the soil both in nitrogen and humus, is a rapid and cheap method of feeding the soil. The subject of green manuring opens too wide a field to be discussed in this half hour.

Second, The calling out the reserve materials and bringing them into active form is a method of feeding the soil too little considered by the farmer. I have already spoken of the soil supply of potash by this means. To make the soil thus feed itself is the best of all methods. The supply of potash in many soils is abundant, yet the crops may starve for potash because it is not in available form. The incidental effect of most of the tillage operations on the farm in bringing out these reserve materials is worth considering.

One very successful farmer who kept his farm in excellent condition explained this by saying that he used three befores: He "cultivated his land before it was weedy; he rested it before it was weary, and fed it before it was hungry."

Of all waste materials on the farm none are more undervalued than

WOOD ASHES AND BONES.

When we consider how large amount of farm produce is represented, so far as mineral matter is concerned, by a hundred pounds of wood ashes, we perceive how wasteful is the throwing away or selling for a pittance this concentrated gold of agriculture. A hundred weight of wood ashes represents the average mineral matter of eighty-five bushels of wheat or corn, and of ten tons of small fruits. Even leached ashes have great value in bringing up the light sandy soils, and in reclaiming mucky lands. Ashes of mineral coal have very little manurial value.

Bones are very valuable. Buried under a fruit tree or grape vine where there is no danger of their coming to the surface by cultivation, they will feed the plants and blush in luscious fruits for years. By composting the bones with moist wood ashes for three months they will break down into a soft mass that will readily mix with the soil and feed it richly.

The farmer that throws away the bones on the farm and buys superphosphates in their place is paying tuition in a very dear school. In some kinds of farming it is wise to buy commercial fertilizers, but not till the valuable waste products on the farm are utilized.

I have spoken of soil exhaustion being most frequently caused by the lack of available nitrogen in the soil. The remarkable results of a small dose of nitrate of soda in

ACCELERATING THE GROWTH OF CROPS

on such soil is an illustration of this fact. The farmer may then conclude that the wise thing to do is to buy and use the nitrate of soda on his farm. The nitrates are good, but they cost money. If the farmer can make nitrates on his farm and in the fields where they are needed, this is better than paying cash for the Chili salt. Under proper condition of tillage and with the right composition of the soil, the natural formation of nitrates goes on in the soil every year, and these soil nitrates are just as valuable as any bought in the market. For nitrification the soil must contain a good supply of humus (by green manuring), an open porous condition of the soil during the warm months, and the proper amount of moisture, but the absence of stagnant water from the upper three feet of soil. The frequent stirring and cultivation of the soil are not solely for killing weeds, but also promote the conditions favorable for nitrification.

Three closing suggestions:

First, Buy phosphates in addition to using bones.

Second, Save potash by putting all your ashes in the soil.

Third, Raise nitrogen by leguminous crops and nitrification.

EXTRACTS FROM LOCAL PAPERS.

We have extracted from each of the papers read at Institutes by local speakers, which we could obtain possession of, some significant or striking paragraph. The extracts are filled with meat and afford splendid texts for discussion in granges, farmers' clubs, and future Institutes. Many valuable articles at Institutes were not read but spoken. But we have collected all that could be secured and present these extracts as forming one of the very best portions of this bulletin.

LIVE STOCK ON THE FARM.

Without discussing the respective merits of the various breeds of sheep, cattle and swine, it is sufficient to state that with the present conditions confronting the farmer he must raise stock with a view to the production of mutton, beef and pork. Although I believe the so-called mutton sheep are more profitable under existing conditions, yet I would be loth to strip my farm of fine wools, for while less profitable for mutton, they are still more profitable wool growers and will do much better in considerable flocks than the coarse wools. Moreover, as I am convinced that the half-breeds give the farmer who keeps large flocks better results than the coarse wools can, a flock of fine wool ewes can be kept profitably. And then, should the time come when wool growing is again profitable, we would not be without our flocks.—T. C. Taylor, at Lapeer Institute.

LIVE STOCK IN FARMING.

All products raised should be consumed on the farm, therefore it is best on farms to keep a variety of stock that all kinds of produce may be used to advantage. It is of vast importance that all fodder should be steamed, and in winter should be fed warm, especially to fattening stock as they can thereby be fattened in less time than any other way possible.—B. W. Madill, at Gladwin Institute.

SELLING STOCK.

Some feeders will buy our hay and grain and then go to the stock yards and buy stock to feed. Now, brother farmers, can we afford to let them do this? Will the farms of Tuscola county keep up their fertility? As nearly as I can ascertain there are about 1,000 tons of hay and 150,000 bushels of oats shipped from Vassar each year; this but from one market in the county. Would it not be better to sell some

of the hay presses, and enlarge our stock yards, filling them with the best of stock? Educate the people to eat nothing but the best of meat. This can be done; see how our people have learned to eat mutton during the last few years. Feed all the grain and fodder you can on the farm where it is grown, it is better than buying commercial fertilizers.—F. A. Bradley, at Vassar Institute.

HOW TO GIVE MEDICINE TO A HORSE.

A better way of giving medicine when quantity is not great, is by throwing the medicine well back in the mouth with a syringe, using one that will hold one or two ounces. If it has a ring in the handle of the plunger it can be conveniently used with one hand. The more concentrated, if non-irritating, may be given from a small ½ or ¼ ounce phial, the dose being emptied on the tongue of the patient to be there absorbed. Stimulants, as alcohol, ether, whisky, etc., in many instances may be given in the drinking water; the animal being eager to quench his thrist does not seem to notice the taste of the medicine.—Dr. J. C. Whitney, at Hillsdale Institute.

A POINT IN HORSE BREEDING.

I think in breeding horses in the past the tendency has been to extremes, either too light or too heavy. What is wanted in most cases is a general purpose horse. If you have a large farm and work to keep them, then principally you want that breed. If your farm is smaller, a lighter class would be better as you would have more or less road work. But in raising for the market raise the class there is a demand for even if you do not just fancy it, as it is a question of dollars and cents. Judge the points of sire and dam. If one has a weak point see that the other is particularly strong; where one is weak see that the other is well developed. See that they have a good disposition. How often you see a well-built horse but the disposition such as to render it valueless. There are differences of opinion as to which is the best class for the heavier. I favor the French or Percheron for the general purpose, the Cleveland Bay for the roadsters. the Standard bred that have size. I am in favor of fall colts. In the spring colt, it is taken from the mother and put on coarse feed in cold weather; in the fall colt this is the opposite. It depends on the mother through the winter, goes on green feed in spring, and is then generally as large as a yearling.—W. M. Burdick, at Chesaning Institute.

SLAUGHTERING PORK.

Don't give the hog any corn to eat the evening before butchering; give plenty of water to drink. Be careful about handling while killing, for the hams are easily broken, especially in young hogs, and blood may settle in the center of the ham and not be noticed while cutting up, and too much blood would spoil the ham. I believe that an experienced man, having a good knife that will with one stroke sever the main artery where it passes from the neck into the body, and not allowing the knife to go under the rib nor sever the windpipe, will do the work better than any other way. And if possible have the hog suspended by one hind leg, as it will insure better bleeding. As soon as the hog is dead scald in water of 150 degrees; a slight variation should be made according to age, or if covered with ice. A vat or caldron large enough to immerse the hog is preferable, but is not always at hand. The hog should be moved quite freely while in the vat to give a good scald.

After the hair has been removed, hang up, scrape, and wash down thoroughly; some needing more than others, according to the way the hogs have been kept and fed. And here, if not before, is where slop-fed hogs will begin to show it, and may be detected clear through the process of preparation. Hang up in a cool place, but not where they will freeze. Remove the entrails and wash out, not using any more water than is necessary.

The sooner the animal heat can pass out the better, and unless the weather is in your favor, would advise lifting out the leaf lard, cutting off the head, and split

down through the center of the back, or on each side of the chine, as you desire, and then let it hang until thoroughly cooled through. When the meat will be solid and not draw apart between the muscles, and may be trimmed nice and smooth.—Orville Dougherty, at Three Rivers Institute.

FEEDING SHEEP FOR MARKET.

For roughness, I think most of the audience will agree with me, that unless the silo is to be resorted to, clover hay well put up at just the right time makes an almost ideal feed. But, alas, it has become almost a memory of the past. For the last two or three years our sheep racks have seen many and varied substitutes; timothy cut quite green, wheat straw, oat straw, unthreshed oats, bean pods, corn fodder, all have been used in greater or less quantities. Timothy, especially if at all ripe, should be fed very sparingly. We have obtained good results from feeding bright, clean, bean pods and wheat straw, fed alternately. Our experiment station reports that from a bushel of shelled corn and the necessary roughness, twelve pounds of mutton can be produced. Our experience would teach us that this is a higher gain than can be maintained for any length of time. Nine pounds to the bushel we think to be a good gain, more falling below than going above, even in good feeders. This is a rate not above the possibility of any one with good judgment and the skill that comes from a few years' experience, and still one that yields a good profit.

A good many writers and speakers on this subject end up by saying that even when the profit of sheep feeding is small, it pays because of the valuable fertility that is returned to the farm. We think this is bosh. While it is true that much is returned to the land, we claim that the farm should feed the farmer as well as the farmer feed the farm. If a man and his entire family are to slave an entire year to raise feed to feed out to procure that by which another crop can be raised to feed another year, he would better either die at once or give up farming.—H. E. Powell, at Ionia Institute.

SHEEP FEEDING.

I should recommend beginners to start with registered sheep, especially if their taste, surroundings, and means will allow, for the reason that they are more responsive to care and feed. Do not understand me that they need more feed, for that is not the case. They attain an earlier maturity, yield more mutton and wool that command higher prices in market, and have far greater selling value to breeders and stock raisers. They have a uniformity that is attractive and as "blood always tells" in a thousand advantageous ways the breeder gets a better profit and their association and presence is a great delight and interest to the owner. As to what kind of sheep to keep I advise the mutton and wool-producing breeds, the practical "general purpose sheep."—J. H. Taft, at Three Rivers Institute.

POINTS IN SHEEP BREEDING.

Men are very likely to be led astray in the selection and breeding of sheep by allowing undue prominence to a single quality. Some men never speak of a sheep except to say how large it is; others seem to think about a sheep as if created for no other purpose but to give a desirable fleece of wool. It is perfectly legitimate to have sheep that are specialists. There are flocks on which we may draw for those peculiarities which we desire to impart to other herds. But if we would have a practical all-round sheep for profit to the general farmer, we must estimate carefully, not one, but all its many qualifications in order to determine its fitness for our purposes. If we would have the largest body we must accept it at the sacrifice of both quantity and quality of wool and hardiness of constitution. If we would have the most wool of the finest quality, it must be accepted at the sacrifice of length of body and size of carcass. No man has ever yet succeeded in producing

a sheep that combined all the most desirable qualities, each in its highest degree of development, and I am very skeptical of its possibility.—Stewart Gorton, at Mio Institute.

PROFITABLE BUTTER PRODUCTION.

We practice, and I believe it the best, the Swiss system of deep setting. The water should be cooled down to 40° or 45° and kept as near that temperature as possible. This necessitates the use of ice or a flow of water from a cold well through the creamery or vat containing the milk cans. The cover should not be put on the creamery or cans until animal heat is driven out of the milk by the cold water surrounding the milk, as the rapid cooling seems to drive out with the heat any odors that may be in the milk. If you can set your milk under these conditions the cream will be all raised in from 6 to 10 hours, which will be considerably less expense for cans or creamery room.—John Hunt, at Bad Axe Institute.

JERSEYS IN THE DAIRY.

From what I have learned in our short experience with Jerseys I would not buy a sire or a heifer unless they were from a family of producers. I had rather pay a good long price for a good individual from a family of butter makers than to have a fine looking animal with no merit, as a present. A dairyman can sink money fast by using a poor sire.—Gardner Avery, at Holland Institute.

BUTTER MAKING.

Then comes water, pure cold water, that God given blessing to men. Wash the butter well, stirring it lightly, and if there are any of the little annoying specks they will float off. Should it be very warm weather, allow the butter to harden in the water a moment or two, and then drain and salt, adding from one to one and one-half ounces, according to taste. Let it stand two or three hours in a cool room, then work to expel the buttermilk. A second working is necessary, but care must be taken not to break the grain, which would cause the butter to be greasy, and lack that tendency to break. In packing in jars, put in two or three inches of butter, making it solid, sprinkle a little table salt between each layer, and when the jar is full, cut a cloth to just fit the top, press down and put a layer of salt over it to exclude the air. The less it is exposed to the air, the better it will keep.

To sum up how to get good butter, there are three things needed—cows, cold water, and common sense.—Mrs. H. B. Pratt, at Benzonia Institute.

CHICKENS ON THE FARM.

In regard to feeding, it seems more humane to give fowls a warm breakfast in cold weather, but I have strong doubts about its increasing the egg production. I have fed them during an entire winter on mixed grain and have found quite as many eggs as when fed with a warm mash. It is possible it makes a difference with some breeds. Most poultry writers advise giving warm drinking water to fowls; if you put a dish of warm water beside one of cold they will all crowd around the cold water to drink, in preference to the warm. I do not suppose they like the taste of warm water any more than we do. The amount of water a fowl will drink, when they can get it fresh and clean, is surprising. A beer keg sawed in two makes a very serviceable drinking bucket, and, is, I think, the best use to which it can be put. I have some stone-ware drinking fountains that are excellent for summer use, particularly for young chickens, as they cannot get into the water. A brush broom is very convenient for cleaning the drinking vessels and feeding crocks. —Mrs. F. W. Dunham, at Auburn Institute.

POULTRY.

Time will not permit me to treat on diseases, but I will say that filth and uncomfortable quarters are the cause of nearly all troublesome diseases, and prevention is better than cure. Buildings should be whitewashed with lime and fumigated with sulphur, and kept clean and free from lice; if they once get started it is almost impossible to rout them or to realize any profit.—Perry Ostrander, at Grayling Institute.

POULTRY KEEPING.

It has been frequently said "Don't feed poultry more than twice a day." I say you may feed them three or more times per day, but don't feed them any more than if feeding twice a day. If poultry have the run of a yard in the winter where they can get any considerable amount of grain in following after other stock, it will be best to consider that fact and not feed the hens so much. And in the summer when on the range, they must be fed less and perhaps not at all, depending upon the number of chickens one has and whether there are stubble fields for them to range over, etc.—H. A. Bunnell, at Albion Institute.

FORAGE PLANTS.

And that brings me to our own corn, and it is not many years ago that we used to say "we can raise this and that, but it probably will never be a corn country." But I believe that the corn crop now pays as well as any crop we raise. I used to put in quite a portion of mine in drills, and thick enough so that it did not ear much, and had some very heavy that paid well; but I never have enough ear corn on my farm, so year by year the drills have grown less and more in hills. Last year I had one-quarter of an acre of drill corn and 10 in hills. The yield of fodder on the piece of hill corn was much more than any piece of grass, and I still have a fine lot of sound hard corn ears that come in handy for horses, cows, hogs or chickens, or may find its way to the house in various dishes that are both good and healthful. So I should say raise more corn and give it better care; then keep the stock to eat it and put the manure on next year's corn field, so as to have a better crop; then more stock to eat that and our farms will grow better year by year, till with good buildings, heavy forage crops, large orchards and fancy stock, the farms of Emmet county will be one of its main attractions.—E. G. Ludlow, at Harbor Springs Institute.

WINTER GARDENING.

The producing of vegetables for market by artificial methods is wholly unlike that of former growing. The knowledge of this industry is as yet in its infancy, while the demand, with the American people, is greatly on the increase. It has only been a few years since people demanded fresh vegetables in mid-winter, and now both the grocery and market-men are obliged to carry them or lose a large percentage of their trade. We can hardly account for this, unless our physical natures are susceptible to the changes that are constantly taking place in the animal and vegetable kingdoms.

The gardeners of today must necessarily have some specialty upon which they may rely. In the vicinity of Toledo there are many gardeners, none of whom but have some special production. But in every particular it would seem a case where the early bird catches the worm; for the vegetables are produced out of season, (as the vegetable grower calls the dull season), when the markets are flooded, and necessarily low. The hot-bed, as an adjunct of the market gardener, has seen its best days. It is being superseded by the green-house. A few years ago it was common to make yearly additions to the stock of hot-bed glasses; the day came when, owing to their large number, there was very little profit in the produce raised. Then the green-house sprang into existence, and some of the ventures proved highly profitable. At

first it was thought necessary to build quite low, that the glass might be near the crop, as in hot-bed culture. But this was an error. Today the houses are carried higher, with advantage to the crop.

The improvements in transportation have brought the gardeners of our populous northern cities into direct competition with those who are favored with a warmer climate, and in competition with the product of such a climate. But instead of being forced to the wall by this competition, they have changed their methods, and by the use of glass and artificial heat they are now able to put a product on the market that, for freshness and crispness, puts the wilted vegetable of the southern grower to shame.—George R. Agnew, at Monroe Institute.

FRUIT GROWING IN SOUTHERN MICHIGAN.

Along in the early thirties, it began to dawn on the minds of our thinking people that there was no reason why the best localities in southern Michigan could not grow tender fruits as certainly and cheaply as, and compete in the markets with any locality in the country. There were several orchards planted on this "great divide" that have been kept in continuous bearing since 1839, by replanting as the old trees failed. The only failures in these orchards have been caused by overbearing. In fact, there have been but three entire failures in fifty years. The base of successful and profitable fruit growing must rest on a fertile and well drained soil with an altitude high enough to ensure the best possible air drainage and free movement of winds. These latter two conditions are two indispensable factors.

Let us now analyze the conditions favorable to the best interests of fruit culture, in the geological formation of the fruit belt comprised by the counties of Washtenaw, Jackson, Lenawee, Hillsdale, Branch, and Calhoun. The southwestern counties lack only in altitude. This fruit belt, and in fact all the choice fruit sections of the State, are situated on the horizon of the great salt and coal basin of Michigan. Ann Arbor, Manchester, Woodstock, and Jonesville are almost exactly on the center of the exposure. Along this line for 80 miles we have the highest lands in southern Michigan, as shown by the tables of the weather service bureau. This section is again fortified against cold waves from the northwest by the great wall of heated vapor constantly rising from Lake Michigan and deflecting thence to the south, as illustrated in the memorable cold wave three years ago that destroyed the entire crop of citrus fruits and many trees, and also the peach crop to the center of Florida, and left our fruits untouched, though aimed directly for us.—Hon. L. D. Watkins, at Hillsdale Institute.

PROFIT AND LOSS IN FRUIT GROWING.

It is profitable to fight yellows when the disease unfortunately prevails. Persistent fighting will hold the disease in check, if not entirely eradicate it, with more or less success as the fighting is general or restricted in area. I have in mind four adjoining farms on which, fifteen years ago, were good bearing peach orchards. Yellows prevailed to a limited extent, varying in the percentage of cases from year to year, but on the whole increasing, reaching the maximum two years ago, when it began to wane. In these orchards the disease was fought persistently from start to finish; affected, and even suspected, trees were promptly eradicated, root and branch, and their places filled with young trees. These orchards are still in reasonably good condition, with trees varying in age from one to twenty years, productive and profitable.

On either side of this block and contiguous to it are two farms whose owners, within the same time, have set orchards, grown them to bearing age, gathered large crops for two or three years, shipped yellows fruit, evaded the yellows commissioners by one means or another, allowed diseased trees to stand from year to year, until at last they were obliged to destroy their entire orchards.

In the one case the orchards are kept good, in the other entirely destroyed. The profit and loss are evident.—J. W. Hawley, at Allegan Institute.

GETTING THE MOST MONEY OUT OF FRUIT.

The question how to get the most money out of our fruit crop suggests what kind of a crop. Shall it be such as we can and must raise if we hope to make a success of fruit growing or shall it be such a crop as was produced in western Michigan the past season, as I am satisfied that among the tree fruits, especially the peach, apple and plum, if the growers had fed one-half their crop to the stock on the farm, given one-half the remainder to their neighbors and shipped the strictly prime fruit nicely packed to reliable houses, more pleasure and profit would have been the result.—J. J. Gee, at Muskegon Institute.

RASPBERRY CULTURE.

I could have shipped my berries, but I do not believe in shipping my crop of berries out of town, as they never look as nice as they do freshly picked, and as long as it pays the Owosso merchants to have about 20 bushels of red raspberries shipped to them daily, I think my berries are needed here. I am in hopes that people will learn to appreciate choice and freshly picked fruit, as my intention is to only sell the very best. We deliver twice daily and what we could not sell is brought back for my pickers, who gladly purchase them for 1½ and 2 cents less than we could get in town. My blackcaps I could all sell at the farm and received orders for them two and three weeks ahead, they are more in favor with the people. Of 1½ acres of red raspberries I harvested 67 bushels or 2,144 quarts.—Mrs. Agnes Freeman, at Laingsburg Institute.

SMALL FRUITS ON THE FARM.

For red raspberries, set Cuthbert and Shafer's Colossal, for black caps, Gregg and Ohio. Let the ground be made mellow and rich; set plants well down in soil in rows five feet apart, thirty inches in row, cultivate thoroughly first year. By the first of September the black caps will have run off on the ground from six to ten feet, the end of the vine will have a whitish appearance, some call it a snakish appearance. Now, if you want to propagate plants for the next spring's setting, you can easily do so by putting down these tips which will soon take root. Early in the spring cut the vines back to within fifteen inches of root and mulch the ground heavily with coarse manure or straw so no weeds or grass will grow. The second season the plants make an upright growth. When new shoots are twenty inches high, pinch the end off and they will send out lateral branches; these cut back the following spring to within ten inches of main stalk. I should recommend the farmers to plant in a square or compact form, rather than in long, single rows, as it will be much easier to keep the mulch from getting scattered. If kept well pruned and mulched, a very small patch will furnish the family in berries for five or six years.—F. A. Smith, at Lapeer Institute.

STRAWBERRIES FOR FARMERS.

Unless you know your strawberry plant to be very fertile, broadcast a good coat of rich well-rotted compost evenly over the ground the autumn previous to getting the plants. During the winter make your selection of varieties and order your plants of some reliable grower, who you know has the reputation of marketing fruits of first quality. In the selection of varieties it is essential that you give attention to the staminate and pistillate sorts and the order of their setting; that you select early, intermediate and late kinds to secure a succession of fruit. There should at least be one row of a staminate sort to two of a pistillate, and the staminate had best be a little earlier in bloom than its neighbors.—E. H. Hunt, at Ionia Institute.

MODERN BEE-HIVES.

My favorite, however, is the eight-frame dove-tailed, which is without doubt the simplest and easiest hive to manipulate that we have in America. I will try to tell you some of the reasons why I like it better than any other. I winter in the cellar, and keep my hives in the shade in the summer, so you see I do not need a chaff hive, and it is a bungling, clumsy thing at the best. After a careful test of the eight and ten-frame hives, side by side, I have decided in favor of the eight for various reasons. And, again, any one who has used the dove-tailed hive will know the value of having a hive that he can take apart anywhere and not disturb the bees. If you want to take the bottom board off all you have to do is lift the hive off from it. If, when the bees are working in the supers, you want to examine the brood nest, just take your screw-driver (which, by the way, is an absolute necessity in the bee-yard), and pry the supers and brood chamber apart, then set the former carefully down on the grass; when you are through set it back, and I think I am safe in saying that you have not delayed the working of the swarm one hour, unless you nave been clumsy enough to stub your toe and jar the hive, and if you have you are apt to regret it right away.—John M. Rankin, at Emmet Institute.

VALUE OF HONEY.

Pure honey is said to be a physiological sweet, and, according to Prof. Cook, is a digested nectar ready for absorption and assimilation by the system without undergoing any chemical change. Pure honey should always be freely used in every family. Honey eaten upon wheat bread is very beneficial to health, and children would rather eat bread and honey than bread and butter, and one pound of honey will reach farther than one pound of butter. And I feel free in saying that if a great deal more honey had been consumed throughout this county and State within the last few months, diphtheria would not have been quite so prevalent as it has been.—Randolph Graden, at Plymouth Institute.

VALUE OF GOOD ROADS.

It has been urged by some that farmers living near the city are benefited by bad roads in the more distant districts, because they can manage to get to town and realize a higher price for their produce, while those living farther away are unable to reach the market. With a similar fallacy it has been stated that the country merchant is benefited by bad roads because the neighboring farmers are compelled to sell to them and take their goods in exchange.

The increased value that good roads bring to a farmer's estate will more than recompense him for what he considers a loss in the price of his produce, and in addition he reaps the advantage of purchasing his necessities at a lower price. It is the complete and free interchange of commodities within our own borders which brings the greatest good to the greatest number.—G. D. V. Rollo, at Cheboygan Institute.

GOOD ROADS.

There is one feature of the law to which I invite your particular attention. It is this: "All road work hereafter done upon roads that have been opened and worked for ten years or more, except such as may be required for necessary repairs, shall have in view the permanent improvement of such roads by graveling and turnpiking." A splendid sermon on "Good Roads" could be preached with that for a text. Every hour's work upon the road should be with an object in view, and that the permanent improvement of the road. If but one rod of road is made in a year, that rod should be made good. There are but few districts in our county that can not procure good material within accessible distance, and an effort should be made to do so. In every township where it can be found it should be made the

duty by law of the township board to purchase at least four gravel pits in different parts of the township, which should be furnished free to every district or individual who would draw it on the road.

Gravel is, and will continue to be, the material with which our country roads must be improved. The cost of the various kinds of pavement will preclude their use, except in isolated instances, outside of our cities. My limited observation has convinced me that the best pavement is the cheapest. At any rate cedar block pavement, unless sapless blocks are used, is short-lived and inferior to a well graveled road, properly made and on good foundation.—Arthur P. Loomis, at Ionia Institute.

ROAD IMPROVEMENT.

It is a matter of regret that the people in the country think the people in the cities who interest themselves in the direction of good roads are doing so from a selfish motive. They labor under a wrong idea. I venture to say that no well-meaning citizen or taxpayer in the city who interests himself in so laudable work as good roads is lying awake nights to figure out a scheme whereby to do up the farmer. There is no doubt a class of city people which is working up schemes to beat the farmer, as also there are plenty of horny-handed sons of toil who are not slow to whack it to the city chap when they get a chance, but let us consider them as being unworthy as company in our class. Good people both of the city and rural districts go hand in hand with good roads—they are not in mercenary business. Settle this in your minds firmly and fearlessly, get together, establish a basis for taxation and assessment, lay out a county system for all its people, have economical, honest work done on a cash basis, and you will never want to go back to the old pathmaster idea so long past its time and usefulness. Let the motto be not more taxation, not more burden, but more and better work for the money, less burden to man and beast, less wear and tear on equipments.—C. H. Peters, at Chesaning Institute.

DIVERSIFIED FARMING.

One of the greatest benefits to be derived from diversified or mixed husbandry, that every good farmer who practices this mode of farming will have, is the many different funds he has to draw upon during the year, which is very convenient to say the least, when we have no bank account, which I venture to say most of us farmers have not, except on the wrong side of the ledger.—C. J. Phelps, at Rose City Institute.

FARMING ON LIGHT SOIL.

There is another feature that should encourage the farmer to look more favorably on these lands, and that is the spontaneous growth of forage. You take for instance the sedge grass, commonly called bunch grass, which is generally considered worthless—and the writer once shared that opinion—but experience has shown that for dairy purposes it is equal to clover or timothy and possesses one quality that makes it more valuable than either of these grasses, and that is its ability to stand our winters and not kill down, so that as soon as the snow disappears cattle can be turned out and will increase flesh and flow of milk at once.—E. W. Chase, at Gladwin Institute.

ROBBING THE FARM.

Notwithstanding the many brilliant examples to the contrary, there is an impression among the average farmer that "book larnin'" and horny-handed toil cannot walk hand in hand, and does Providence favor him with a son of more than ordinary merit, "what a pity to bury such a talent on a farm?" John is stupid but he is stout and honest. John is all right to run the farm but Tom, "O, he is so smart! takes to eddication nateral as a duck takes to water. We must eddicate him for a lawyer, a docter or a preacher." Does one of his daughters possess rare intelligence,

his neighboring farmer's honest son is given to understand that he must look elsewhere for a wife, his daughter must be educated to preside over some elegant city home, and forthwith the farm is robbed of intelligence and education.—Mrs. D. S. Fairchild, at Gladwin Institute.

BENEFITS OF FARMERS' INSTITUTES.

Young man, did you ever stop to think that no matter what vocation in life you may choose, you cannot have too much education, and the moment your education stops, that instant you and your business will begin to retrogade? There is no such thing as standing still, you are either going backward or forward. How easy it is to start from the top of a long hill and go down, but when we commence to climb up, how different, especially if we have a load to carry; it is only after much slipping and hand struggling that we arrive at the top. So it is with life, especially on the farm,—it is a continual struggle to climb upward toward success morally, physically, intellectually and financially.—C. M. Pierce, at Vassar Institute.

FARMERS IN EUROPE AND AMERICA.

Go with me through the entire length of the world-famous valley of the Rhine, with its battlemented castles standing guard today as they have done for a thousand years upon its long line of picturesque mountains, and admire the beauty of the scene, but everywhere you will have your happy reveries rudely shocked by the scenes of rugged toil accompanied with the unmistakable evidences of poverty and want. You will see directly in sight of and under the very shadow of these imposing towers, the poor, scantily attired and toiling from from early morning until late at night for the barest necessities of life. You will see the implements used in tilling the land are in strict harmony, so far as the age is concerned, with these ruined castles that are relics of a bygone era. Their plows, for instance, are heavy-looking, wooden -beamed, clumsy tools, and are drawn through the long weary hours of the toilsome day by a single cow yoked to the beam and driven, in many cases, by a woman. When I say a woman, do not for a moment picture in your mind's eye such a lady as your mother, or your sister, or your wife; but a barefooted, bare and brawny armed, and sometimes bareheaded woman, one of God's gentle women who is nobly doing her duty, as her crude education has given her to see it. She has children, and perhaps aged parents who are dependent upon her for their daily bread and most heroically does she face her bitter fate and toil, as few of my lady friends, thank God, have ever seen, to win from the soil the bare necessities for an earthly existence.

You will see girls and boys, in many instances, herding sheep, or geese, or cows, and the poor pinched faces are impressed too plainly with the cruel hand of hunger. You will see them, eight or ten years of age, knitting stockings while they walk about to keep the sheep or geese upon their allotted space. They are not permitted to sit, lest they should neglect their charge and a spear of grain would be nipped from their neighboring plot. You will see men and women, in many cases, digging over the stubble ground with great heavy hoes preparing it to sow another crop.

Should it not cause a blush of shame to tinge the cheek of him who enjoys the liberty, the education, the wealth, the luxury of a land like ours to complain at his environment and curse the government that makes it possible for him to enjoy the fruit of his own toil? I have no use for the chronic grumbler who goes through life with his eyes cast down, his countenance sad, his brain continually contriving some new grievance with which to sour the life of his neighbor, his tongue busily wagging only to release from his disordered mind some new and fancied wrong.—C. B. Kidder, at Armada Institute.

MIXED FARMING.

A man on a farm of say 80 to 160 acres with his family to support, taxes and expenses to meet, with perhaps a certain amount of interest to pay each year, is in no condition to stake everything on one crop or product which, from natural causes, may prove to be a failure.

My ideal farmer is one who, to begin with, has a business head upon his shoulders, is a specialist, if you please, in the production of each crop in its season and an expert general farmer. Such a one, according to the natural law of the survival of the fittest, may be depended upon to weather a period of hard times and find a balance upon the right side of the book at the end of the year, for he has not placed all his eggs in one basket and made a failure through conditions over which he could have no control.--W. N. Pierpont, at Mt. Pleasant Institute.

THE VALUE OF FARMERS' CLUBS.

The real value of the farmers' club from the present point of view will probably never be known or appreciated. Its object is right. Its teachings good. Its blessings manifold. Who, among those who belong to some club and take an active interest, has not already received much good from these meetings? Who, among active members, does not appreciate the Michigan farmers more and more? Who does not have a stronger desire for good farm journals, a greater hankering for agricultural literature? Has there not much been accomplished? Do we not gain much by mingling with farmers who have made a success of life financially. Are we not better by meeting with those who are better morally? Do we not improve by exchanging ideas with those who are better informed than we are? Does it not stimulate our ambition to improve our own condition where, in meeting with our brother farmers, we see improvements and conveniences over our own.—A. C. Rowlader, at Mt. Pleasant Institute.

FARMING AND FARMERS.

While the railroads of the United States are valued at $13,000,000,000, the farms of the country are not far behind, their valuation being estimated at $12,000,000,000. When one thinks of the capital invested in farming land, he realizes what an important part it plays in the welfare of the country, and if he traces it back for a number of years, he will be amazed at the rapid strides that have been made in this pursuit. It matters not what line of business or what profession one may take up, he will find that methods change rapidly. The successful merchant today cannot conduct his business on the same plan as he did twenty-five years ago. Neither can the manufacturer compete in the markets of the world unless he has the most improved appliances and machinery, This same rule holds good with the farmer. If he wants to keep up with the procession he must hustle. If a man falls behind five years in these days, he cannot catch up. There is but one way to be successful, and that is to keep in line. The farmer should be as well posted in current events as any one. He has time to read, if he will improve it. The man who reads is the one who thinks. If ever there was need of thinking men it is right now among the farmers.—President Thomas, at Adrian Institute.

IMMIGRATION.

A more rigid enforcement of the present regulations for turning back undesirable classes, by withdrawing all immigration agencies, public and private, and holding our consular agents to strict accountability, demanding that they guard as strictly against political contamination as against contagious disease.

Require a residence of ten years before voting. Not sooner will the average immigrant acquire an intelligent appreciation of the priceless value of freedom regulated by beneficient law.

Rigidly insist that the schools of the State shall be taught in the language of the State. Not otherwise can the future voter of foreign parentage become impressed with the unity of the nation in which a beneficient Providence has cast his lot.

Demand of all future immigrants not only a residence of ten years, but sufficient knowledge of the English language to read and write it, and also to pass a creditable examination in the United States constitution. Such a demand is not subversive of the individual right to a voice in determining his own governmental relations, it is simply demanding of him such maturity of intellectual powers as is supposed to come to him physically when he reaches the age of twenty-one years.—T. S. Clark, at Plymouth Institute.

FARMING.

It is remunerative. Yes, in more than one sense. It is remunerative, in that by it we provide ourselves comfortable homes and wholesome living. It is remunerative, in that our surplus products will always command a price at some figure. To the thrifty farmer it is remunerative, in the pride he takes in his well-filled granaries and barns, his fields of waving grain, his horses, his herds and flocks. It is remunerative to him in the upbuilding of his community; it is remunerative to him in the effects and consequences that his endeavors will produce upon others in his community, but above all, it is remunerative to him by the legacy he will, by his examples of energy and patient toil, transmit to his own immediate posterity.—Robert Kittle, at Mio Institute.

THE CREDIT SYSTEM.

In conclusion, I may say that if the merchant will make no difference between a cash and a credit transaction, and the farmer has a level head so as to buy nothing but necessaries, the credit system is a benefit to him to the extent of legal interest on his money for the term of credit, but if the merchant will make a substantial reduction for cash, or the farmer is likely to buy unnecessary articles, the credit system is a damage to him, and the quicker he gets out of that rut the better.—H. M. Wells, at Howell Institute.

THE FUTURE FOR THE FARMER.

I repeat, friends, that the farmer has had a brilliant past. I prophecy that the future has things as great in value in store for him. Surrounded by every advantage, I ask how can it be otherwise? With every aid that free government offers; with every facility for self-improvement how can he but have a successful future? However, do not think by this that I believe that all farmers are to succeed. The success of the farmer of the future depends as much, and more, upon the farmer than ever before. At no time has this been so true as at the immediate present. The farmer of the present who is making his mark in life is the one who is fully alive to his subject, who is aware that his success lies wholly within himself.

Such is the farmer of the future; such is the man who is to furnish the teeming millions of America with their daily bread; such is the man who is to continue rearing us poets, statesmen, scholars; such is the man who is to continue to be, as he has been in the past, the life and life-blood of this nation.—Gilbert W. Hand, at Emnet Institute.

ORGANIZATION OF FARMERS.

I hope the day is not far distant when every farmer will see the benefit of what is called by some "book-farming," which is in most cases progressive farming, and is only given the former name by those who are retrogressive and wish to cast a slur on those who have devoted their time and brains to the accomplishment of good results. Not only this, but I hope soon to see every farmer sending his boys

and girls to the Agricultural College; if not to graduate from the full course, at least to take one of the shorter courses. Also that the farmers of this, and every other county, be members of some organization, and that the county Institutes in each county may be the combining of all into one.

We have been so diffident, so prejudiced, against all that has been done concerning the enlightenment of the people in regard to the vast number of questions in which we are so deeply interested, that I do not see how we an afford to isolate ourselves in the future from all these organizations, which are for our benefit and ours alone.—E. F. Brown, at Hillsdale Institute.

REQUIREMENTS OF SUCCESSFUL FARMING.

It is as foolish to suppose that you can improve your condition by impoverishing your soil as it would be to expect a rich return of milk or beef, or wool, or pork, from animals that you neglected and starved. Again, a farmer may be making money, carrying on his operations as most people would say successfully, while at the same time he is subjecting himself and family to privations and discomforts for which the money he has made is far from an adequate offset. Farmers, as a class, exercise an honorable economy and industry, but when that frugality descends to stinginess it is as despicable in a farmer as in any one else. To rob our homes of comforts and the means of refinement for the sake of saving money is far from being a successful policy.—J. E. Lewis, at Vassar Institute.

LEAKS ON THE FARM.

If farmers want to make a good comfortable living, and a little money besides, these times, they must do more brain work, be more economical, and waste less. In a great measure it depends a great deal upon ourselves whether we make the farm pay or not. There is too much of a slip-shod way of farming carried on among us, without any fixed methods. Therefore I consider the first great requisite to success depends upon ourselves, and requires that we carry into our business the necessary skill and intelligence, which, when properly directed, is certain to give satisfactory returns.

A farmer should always keep himself well posted in the markets, so that he is not taken advantage of by the buyers, for I find that the most of them require watching. If he takes, say, two papers, which I consider every farmer should, one semi-weekly and one weekly, he can keep himself posted so that they cannot beat him very bad, and the cost of two such papers would only be about one dollar and forty or fifty cents per annum. When we have anything to sell we should always put it in as good condition as possible, for if we put it on the market in a dirty, careless way we will not get the highest price for it, for if the buyers are put to any work cleaning, they will be sure to have their pay out of you for it.—John Marshall, at Vassar Institute.

THE OUTLOOK FOR THE FARMER.

There is one duty too much neglected by our best citizens, and that is a close scrutiny of the working of our political primaries. Caucuses have ceased to be primaries except in name. They have come to be a brief and formal ceremony of ratification. The real primary is a sort of star chamber proceeding that an outsider is not supposed to possess any knowledge of. This is the real seat of the mischief. A coterie of would-be office holders meet at midnight in some back office and slate a program and set up the whole machinery of the primary with the minutest detail, so well understood that there can be no possibility of a hitch in the proceedings—then promptly at the hour named in the call for the caucus they meet and set this preconcerted machinery at work, with everything so well planned, and so well greased that the whole thing moves off like clock work. Their greatest anxiety is to shorten the program, that there will be the least possibility of a hitch, and yet prolong the proceeding that it may have the semblance of decency. So far from its being a deliberate action showing the will of the people, the greatest care

is taken that there be no chance for deliberation. The point of attack on this system is in the caucus, and the knock out blow must be given in the first round. This is a duty that concerns every citizen.—R. H. Underwood, at Mancelona Institute.

"ECHOES" FROM WOMEN'S SECTION. TRAVERSE CITY INSTITUTE.

Do not spend the greater part of your life over the molding board and dish pan.

Have at least a few good books, papers and magazines. Do not vegetate on crocheting and fancy work, but read to educate and improve.

Stop fretting. No good ever comes from it. Take the world as it comes. Use the good and let the bad slip off like water from a duck's back.

Kindness is the keynote of happiness. If you lack happiness, search in your own hearts and see if the fault be not there.

Take care of yourself. Don't wait to be coaxed to do it, for that will never come; do it yourself.

Take more leisure. Don't willingly become a drudge. This is largely in your own hands. Let there be less cobwebs in your mind even if there are more in your house.

Many times we think we need things that we can do without. Do the duty that is nearest, and we will not have time for imaginary needs.

We often have not leisure because we do not arrange our time and work to advantage.

Have within our hearts the highest possible ideal. Be the master of circumstances through power of the highest thought.

The cheerful face is the sweetest face. Cheer makes the homeliest face beautiful.

Farmers' wives should know how to do farm work even if they do not have to do it, then you will be independent. Your husband will be satisfied that, if need be, his work is in experienced hands.

Make friends with your husband's friends.

Husbands and wives both want peaceful homes, but there must be mutual agreement.

FARMERS' WIVES AND SOCIETY.

How often we hear our sisters say, "I have no time to read, I have no time to go anywhere, I have so much to do. I must get up right away and sweep those cobwebs down. Oh, dear, how dirt and dust do accumulate." Then let us try to be a credit to ourselves and bear our share of the burdens of society, doing with a will what our hands find to do, and living always

"For those who love us,
And those whose hearts are true,
For the heaven that smiles above us;
And the good that we can do."

—Mrs. Adelaide Schick, at Rose City Institute.

SAVING STEPS.

I have also been told that an easy way to clean a floor is to scrub it with the following solution: Pour a tea-kettle of *hot* water upon a cake of soap in the scrub pail; when through pouring the water, take out the soap and add to the suds a cupful of gasoline. Of course caution in regard to all fire *must* be used with gasoline.—Mrs. E. O. Grosvenor, at Monroe Institute.

SYSTEM IN THE HOUSEHOLD.

The opportunities for women are far in advance of what they were some years ago, which is demonstrated by the fact that there is now a department in the Michigan Agricutural College for young ladies, where domestic science is practically taught, which will do much in the way of building up the home life. This is as it should be, for a well ordered home is one of the blessings of this life. It is sad to

meet women, as we often do, who do not believe in the law of progression; who do not take advantage of modern conveniences, and who think the way grandmother did is plenty good enough for them. But with all due respect to our foremothers, who can remember a time when labor-saving devices were unknown, when necessity, not choice, compelled them to do as they did, it does not follow that we should do our work in the same way. Rather let us get out of the old track, learn better methods, thus doing away with the tiresome, unnecessary labor. So far as is practicable we should systematize our work, and do it in the easiest possible manner, without neglecting it, in order that we may have an opportunity for reading, thinking, planning for more social good and more culture of mind. —Mrs. John Hunt, at Bad Axe Institute.

MAKING HOUSEWORK EASIER.

And here we are trying to find ways to make housework easier, as our mothers would say, trying to slight things. We have learned that there are more important things in this moving world than scrubbing the back steps every day, while Johnny scours the common for some idle lad to play "heads up" with; that it is more important to know how our boys are employed, and if necessary, to take more time to make home a pleasant place for the children, than that every chair be in place in our homes.—Mrs. J. H. Bailey, at Flushing Institute.

BEST METHODS OF HOUSEKEEPING.

In being prompt she will have meals on time, and a regular time to retire for the night. She will be up in the morning at 5 o'clock, not having breakfast later than 7 o'clock; every person in the house should be at the breakfast table at that hour; the dinner precisely at 12 o'clock, even if the gentleman of the house cannot, through some political gossip, be home to dinner at the proper time. My advice is not to wait for him. As soon as dinner is over the general clearing away of the dishes, and brushing of the dining room; then, if 1 or 2 o'clock should bring the gentleman home to dine just let him wait until you warm some eatables for him, and do not hurry in doing so. The supper should be at 6 o'clock precisely, and the supper work done up without delay. And let that end the day's work. I am not in favor of housekeepers working with lamp light; these hours should be spent in reading and chatting pleasantly, and retiring at 9 o'clock.—Mrs. Thomas Galbraith, at Tawas City Institute.

WOMAN'S PLACE ON THE FARM.

One great discouragement with which farmers' wives have to contend is that their homes often lie in localities where there are no social and educational advantages which tend to develop the mental faculties and strengthen the thinking powers; such as literary societies, farmers' clubs, granges, reading circles, and last but not least, Farmers' Institutes. In such cases she can only find a substitute in the excellent class of literature now so easily obtained. If she cannot do as she would, she must do as she can. We can all read, think, and inform the mind. If we have the ability and the wish to be something beyond a mere working machine, we must ever keep up an intelligent interest in whatever interests other people, and the public in general.—Mrs. E. J. Vandoren, at Ionia Institute.

RIGHTS OF WOMEN.

This talk about the rights of women is nonsense; she has all the rights she needs. Let the sterner sex go out into the world and do the rough work, they are fitted for it, while we can make less noise by quietly assuming our positions with firmness and womanly dignity in our homes or in any business in life that we may be called to follow. In no manner are women inferior to men (that word, as applied, is distasteful to any intelligent man or woman); on the contrary, in many

things she is superior and her influence is far-reaching in the undisputed position she now holds as the good counselor of husband, sons, father and brothers, who are shaping the legislation of our land, as I believe, to the best of their ability.—Mrs. James Gorman, at Chelsea Institute.

THE PRACTICAL WOMAN OF TODAY.

The practical woman of today is essentially an old-fashioned woman in her home and out. One of our writers not long ago truthfully said: "That if any creature on earth had reason for thankfulness it is the modern woman." Never in all the world has she been so exalted in priviledge as today. In good old times the toil of woman's hands alone was of value; if she had brains she was hardly allowed the discovery, much less the cultivation of them, which alone would permit the action of thought and freedom of herself. Compare the schools of the olden time with those of our own time. Compare, if you please, the advantages you or your mother possessed with those your own daughters enjoy at this very hour. The cruel kindness of the old doctrine was that women should be worked for, and not work; that their influence for good should be that silent, modest force that is not only felt but never asserting itself; that it should see, but be unseen; have the power of speech, but ever dumb. All this belongs now to the history of the past. —Mrs. C. B. Burritt, at Lapeer Institute.

THE COMING WOMAN.

I rejoice to bring the good news that the "coming woman" has arrived—I have seen her. She resembles very strongly her mother and her grandmother; those brave women who turned the spinning wheel, helped to plant and hoe the corn, to harvest the wheat, and to dig the potatoes. She has inherited her quick wit, resourcefulness, and desire to help things along, from her fore-mothers. Therefore, we find her giving efficient aid in the work of the church; her hands and heart are in all of the philanthropies; her mother heart leads her to search out the motherless children and to put them into the childless homes.—Julia Dexter Stannard, at Chelsea Institute.

THE NEW WOMAN—WHAT IS SHE?

What, then, is our ideal new woman? One who is pure and upright in motive and character; one who loves her home and believes there is no work more important or exalted than the care of her home and family. One who knows how to give her children strong, vigorous, healthy constitutions by means of a knowledge of the chemistry of foods and proper methods of cooking, that their food may be both palatable and nutritious; and who knows the value of properly ventilated rooms and judicious physical exercise. One who knows how to care for her children mentally and morally as well as physically; who has the ability and the knowledge necessary to lead their young minds onward and upward to a noble manhood and womanhood. One who is a true helpmate to her husband; who shares his successes and his failures, and who makes his joys and sorrows her own.

But, you say, she is not much different from the ideal woman of former days. No, it is true she is not. Woman's sphere always has been, and always will be, the same in a general way. The new woman only reaches out farther and more intelligently toward the same goal to which true womanhood has always aspired. —Mrs. A. C. Bird, at Milford Institute.

EDUCATING FARM CHILDREN.

The district school, improved as it is today, is another mighty factor in character building, and it is a source of much gratification to note the growing sentiment in favor of making agriculture one of the studies of the country school. If the course be adopted, many of the advantages of the Agricultural College, now enjoyed by few, can be brought to the great mass in a practical way. The special six weeks'

course at the College for the benefit of busy farmers' boys and the department for women, lately inaugurated, must also give to young people of limited means an impetus that will last them through life, and assist to place the farmer's calling on a higher plane in their estimation. The growing disfavor with which farm life is being looked upon by farmers' children is indeed to be deplored; and these classes, Farmers' Institutes, clubs, and other educational features must tend to correct this.—Mrs. C. W. Miller, at Chesaning Institute.

YOUR CHILD.

O, fathers and mothers, there is not a higher office under the blue arch of heaven than is yours. The hope and future of our nation lies in the manner in which the duties of your office are executed. You may pray for fame, and you may pray for glory, but the highest prayer that you can offer is that you may do well the work that has been given you. And,

"Though the way may seem hard and long,
And the end far out of sight,
Do thy work well, however weary,
Trust in Him, and 'twill all be right."
—Nettie Edna Crane, at Stephenson Institute.

GOVERNING CHILDREN.

I think mothers should seek a thorough acquaintance with themselves; children are very quick to discern our imperfections and often we seek to cast a mote from the eye of our daughter when, lo, a beam is in our own. Good judgment is needed for the administration of family affairs, and tends to promote love, happiness, and makes good dispositions in the children. Slow to speak, slow to act, is a good rule to go by and generally brings good results.

"Provoke not your children to wrath" is as good advice now as it was in the days of the Apostle, and many a family jar would be avoided if mothers would only act upon it. Mothers sometimes thoughtlessly speak of their children as though they were a burden, and the impression is conveyed to their young minds that mother does for us because she is obliged to more than because she cares for us. Do you wonder if such a mother wants for love in her old age? As a man soweth so shall he also reap; alas, women are obliged to do the same.—Mrs. George Packard, at Flushing Institute.

MOTHER AND DAUGHTER.

In the mother's heart lies the daughter's safety; these two should be so closely united that the wisdom of one is the safeguard of the other, the knowledge of the one is for all practicable purposes the knowledge of both. Beginning the life of womanhood with all the treasures of her mother's knowledge and experience at her command, and with the training and development by our advanced systems of education, may we not hope that the grand record of woman's career for the past twenty-five years may be the noble heritage of our daughters?—Author not known.

MOTHER.

Since it can not be doubted that maternal and filial affections are mutually nurtured and strengthened by the closer and more intimate relations that the mother and child have with each other, so is this bond a closer one between the mother and daughter, and every mother should avail herself of even the smallest circumstance that presents itself to form her daughter's character, and show her how to draw from it a moral lesson for after life. How the heart of every daughter who has experienced a tender mother's care loves to go back to the sunny days of childhood, to be once more at her mother's knee; loves to trace again the lines in that dear face; to feel the pressure of her loving hand laid in gentle benediction

on her brow; to catch again the echoes of that voice which above all others had the power to soothe all pain, banish every sorrow by the sweetness of its melody. Where then, is the teacher that can take the mother's place? There is none.—Mrs. F. A. Bryer, at Monroe Institute.

MOTHER AND CHILD.

No matter how humble the home, if the parents, especially the mother, will only take more interest in their daughters and try to entertain them evenings with some good book, music, or kind motherly talk, instead of letting them run here and there, without knowing where they are or what company they are in, there would be far less of this street running, and many a good girl would be saved to society and herself, where now she is going to ruin.—Mrs. B. W. Negus, at Chelsea Institute.

MAKING THE MOST OF LIFE.

Have I really made the best of myself? Have I grown all that I ought to have grown in the year that is past? These are the questions you will be asking yourself, and not, have I washed every Monday and ironed every Tuesday, and have I always been prepared for company? Now, you have just so much strength, and so much work. You know that the latter greatly exceeds the former; which will you sacrifice, yourself or your work? Knowing that in sacrificing yourself you are wronging your husband and your children. Any one can do the drudgery, but if you are filling your place as a companion to your husband and mother to your children as you ought to fill it, no one else can do it for you. Yet the drudgery is what you are doing and leaving the other undone. When you rise in the morning, instead of thinking how much work you have to do, why not study to see how cheery and bright and entertaining you can be, how pleasant you can make your home, and how much virtue and knowledge you can instill into the minds of your children? Then, when you review the days and the years they will not seem quite so full of failures, and they will bring you pleasure and not regret.—Mrs. C. M. Partch, at ——— Institute.

CHARACTER BUILDING.

In nearly all cases the foundation is laid in the home, and the parents are the builders; the parents, I say, not the mother alone. The idea advanced by so many, that the mother is responsible for the results of the home-training of children, is, I believe, erroneous. All children from the age of two years until they reach their majority, if they remain in the home until that time, are susceptible to the influence of both parents, and traits of character of both father and mother will be noticeable in the characters of their children.—Mrs. B. E. Thomas, at Stockbridge Institute.

HOME AMUSEMENTS.

The first step is to cultivate a taste for good reading, and to furnish suitable reading matter. In so many homes there are no children's papers taken, and no attention given to the busy little minds that are bound to be filled with something. Magazines were never so cheap as now, and from "Babyland," "Little Men and Women," "Youth's Companion," and so on through the list, may be found something good for children of all ages. The eagerness with which they watch the mails for their own paper, and the pleasure they take in reading the stories, are well worth the money invested. The value they receive mentally can not be estimated in dollars and cents.—Mrs. William Van Ness, at Cassopolis Institute.

MAKING THE HOME ATTRACTIVE.

We repeat that home may be attractive without wealth, and that artistic taste displayed in the arrangement of the surroundings, though pleasing to the lover

of beauty, is not an essential element of an inviting home. Still there is an element that must not be wanting, an invisible something that can be felt; an atmosphere of love and sympathy, that not only endears the members of the home to each other, but reaches out and takes in all, whether friend or stranger, who come under its benign influence. A spirit of self-denial and kindly regard for others exhibited in daily intercourse, goes much farther toward binding the family together than all the beautiful things that can be purchased with money.—Mrs. Howard, at Ionia Institute.

FARMERS' FIRESIDES.

We Cheboygan people are justly proud of these farm firesides nestled here and there in the veritable Eden, as we find in and about them some of our warmest and most hospitable friends, and recall many delightful visits with them, which have helped to make our lives brighter, happier, and perchance, better. Let us then resolve that we will make the most of life wherever God has placed us, radiating sunshine in as many directions as possible, thereby enriching our own lives and broadening our possibilities.—Miss Dora M. Ramsay, at Cheboygan Institute.

OUR INFLUENCE.

Then while we may look back over our past lives and remember many failures and disappointments, yet some little things which we may have overlooked and despised, may, under the blessing of God, prove to us in time and eternity that we have not lived or labored in vain.—Carrie Proctor, at Vassar Institute.

SELF CULTURE.

But is there no way by which the isolated farmer's wife may enjoy more social privileges? Already the grange and farmers' clubs have done much toward bringing out the latent powers of her mind. We would suggest a reading club. For instance, let the ladies of a neighborhood make their plans so that they can take some light work, and one read from some good book while the others listen. Be prompt to commence, and prompt in closing, confining themselves strictly to the reading, not allowing gossip to creep in, and it would be surprising how much valuable information one could obtain. People gain inspiration by mingling in good society and comparing ideas. It seems to draw out what is in our minds by rubbing against other people, especially if they are a little higher in the social or intellectual scale than we.

So much good literature may now be obtained at trifling expense that the mind should not lack for food for thought. The condition of the roads is much improved, and horses and carriages so cheap that none are without, and in prospect we see still brighter days. The agitation of the good roads question, which in time may bring rural mail delivery, and the almost universal use of the bicycle, which shortens the distance to neighbors and town.—Mrs. M. Benjamin, at Flushing Institute.

THE NEWSPAPER AS AN EDUCATOR.

I decry the theory that farmers' wives must necessarily work harder than the home-keepers of any other class of workers. With all the modern devices for lightening labor that have come to our assistance it seems as if with a proper amount of executive ability we might secure much leisure, much rest.

The solitude of country life has been broken; what remains is its greatest charm. Genius has ever sought solitude to give birth to its own, but it carries into these sacred realms of thought as a necessary adjunct activity of brain. And it is this, in my judgment, that the farmers' wives should strive for. It is what we have not had enough of.

When our mothers and grandmothers took from the shearer the wool, from the producer the flax, and by their own skill converted them into wearing apparel and fabrics for home use, they were compelled to exercise brain as well as brawn.

Today these things come to us without thought. If the muscle has been spared at the expense of the brain, it is no kindness.

Ruskin tells us that already the introduction of machinery is telling upon the mental status of man. Formerly hand-labor required some calculation, some scheming; hence the machine welcomed as man's friend may yet become a grievous foe. If brain activity is essential to a man's well-being, it is as much so to a woman's. Why are so many of us becoming insane? The best brain specialists say small talk is conducive to cerebral deterioration; and I say, more in sorrow than in rebuke, that our general conversation is small and puerile; and I offer, as a sure and speedy specific, the newspaper. No better brain tonic can be procured for the money; no other so pleasant to the taste, when once the taste has become habituated. We may choose two or three of the best leading papers, add to these one or two of the best reviews, read carefully, think earnestly, discuss freely, and we shall soon cease to be objects of pity and become helpers in life's great work.

There is no issue relative to man's interest in which the interests of woman are not co-extensive. Shall she meet her part of the obligation with lethargy and want of understanding?

Many of us had slight educational advantages. There is no better agent to take up the work where we laid it down than the newspaper. It is a course of study bereft of all abstruse matter, and a course that delights while it instructs.—Mrs. Lucy Swift, at Flushing Institute.

OUR COUNTRY SCHOOLS.

I like the country boy and girl. They are a thousand times more attractive on their native heath than after they visit their city cousins and take on city ways at the expense of country ones. I like many things that belong to the old, ungraded country school; where we read in concert, spelled down occasionally, played "Andy, Andy over" and had the teacher board with us the week we killed hogs. The *good* scholar had a *new* book when he understood the *old* one, and didn't wait for promotion until his basswood mate could catch up, or until a certain date fixed by board rule had arrived. There is no more sense in yoking bright and dull minds together through the "grading era" of their school lives than there would be to make a hustling man live out a business partnership with a chap that had no "get up get" in him. The bright one will get discouraged in either case.

Country-taught arithmetic, spelling, grammar, etc., better prepare the 14 year old graduate from the country schoolhouse to secure a business "job" and hold it, than does the cramming preparation fit the crammed grade graduate to do the same thing.

Should you put the old log schoolhouse on Yale, Ann Arbor, or Princeton campus the young collegian of today would deny its close relationship to his own family. But the chances are that if he and his sweetheart should match themselves against dad and mam in a "spelling down bee" at some church social, they would be comfortably seated long before the old folks quit. I would wager Colburn's Mental Arithmetic had mathematically equipped his father's and mother's minds so much better than his that without pencil or paper they could give more correct answers to examples in interest; quicker give the value of a load of hay, having odd weight and odd price, than can their offspring, graduated in higher mathematics. Simply because they didn't learn so much, but in a way they retained it.

The only "pony" those old scholars groomed was the one grandmother rode to mill, or our grandfather rode to "spark" her.

You can overdo anything. Cultivate size and color in fruit and berries until their shadings would make a chromo blush, but they won't taste any more like an old fashioned blackberry or rare ripe peach than a chromo will look like an oil painting. You can develop grain so heavy-headed and weak strawed the profit is lost at threshing time. You can cram so much into a child's preparatory life that from the physical wreckage you will have small mental salvage.

I would make the country schoolhouse more a home; make the ground beautiful by grading and planting trees that will protect your child, and your child's teacher, from the burning summer sun and biting winter blast. Build respectable woodhouses and other outbuildings, and have the same pride in them that you have in your own farm buildings. As an investment, it will pay; for any stranger seeking a

home in your midst will measure the value of your farm by its surroundings and will pay back to you more than you invested in that little school tax, in order to settle himself and his family in such a neighborhood.

Ventilate and heat intelligently. It will cost less for an architect's sanitary plans than for the doctor's and undertaker's bills after one diphtheria case (say nothing of a dozen). Air is good and cheap in the country, and a well ventilated room will warm comfortably the unfortunate shiverer in the back seat, and cool off the chap that is roasting in the front.

Usefully ornament the walls with maps, charts, and blackboards. "Seeing is believing," and wall lessons will profitably occupy many an hour that blank walls would fail to interest. Don't let price alone determine who shall teach the school any more than price alone secures the farm hand's services. You will pay more for a man that can see a rail when the wind blows it off the fence, or one that is willing to work, and you can better afford to pay a little more for a good one who has the care and cultivation of your heir's brains.

I do believe in liberal education, but rather have a sound bodied child with less Greek and Latin frills, than a broken down encyclopedia.—Geo. W. Hubbard, at Flushing Institute.

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